ExtraSYSTEM

ELEKTRONICKÁ KOPIE MONOGRAFIE

Ediční řada Informační technologie - svazek 2

SELECTED ELEMENTS OF INFORMATION MANAGEMENT AND MARKETING IN HIGHER EDUCATION

Jan Chromý - Liubov Ryashko - Donna Dvorak

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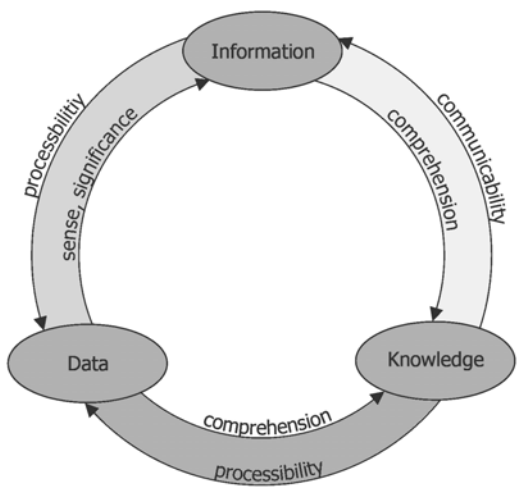

Jan Chromý - Liubov Ryashko - Donna Dvorak

Recenzovali
doc. Sergej Ivanov, kandidat nauk
RNDr. Ing. Juraj Novák, Ph.D.

Odpovědný redaktor
Ing. Miloš Sobek

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Selected Elements of Information Management and Marketing in Higher Education

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Katedra technických předmětů
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Introduction

Information management is a very important part of our everyday life. Everyone needs information not only for working but for own existence as well. The process of acquisition and maintenance of information is not easy, and these issues are very extensive. Transferring and sharing information also is not a simple work that links with other discipline such as communication.

Electronic business is one of the practical applications of information management. Establishment and development of e-business involves the development of the Internet environment. It is also related to the development of technical devices that enable wireless communications worldwide. They enable transferring great volumes of information securely. Electronic business is being developed dynamically. It can be assumed that this trend will continue.

Setting up the correct goals at the very beginning of company e-business plays very important role in its future success. It is necessary to respect the fact that e-business is not an objective itself, but it can be a powerful instrument for the achievement of the business objectives. First, each company founder has to decide in what areas he will be running his business. This solution will involve a decision on the form and method of e-business. Some activities cannot be operated only electronically. But electronic business always provides strong support for different activities of each company. These activities should also include elements of marketing communications.

Effective achievement of any goals in the e-business sphere supposes the acquisition of information, its subsequent processing and exchange with the surroundings. These and other additional activities must be done efficiently and optimally in relation to the given conditions. This brings us to the basis of information management.

Information management covers a very wide area, from which we have selected the purposes of this book dealing with websites, social networks and electronic business.

Web page is linked to on-line store closely. It is its presentation layer designed to communicate with its target market audience. Websites can exist independently for other purposes also without connection with any on-line store. On the other hand, on-line store requires a strong presentation layer for effective communication with the target market audience. The term "target group" is more appropriate for describing the addressees of website, as it is expected that the website intends not to trade directly. The concept of "target market audience" is, in turn, based on the sale. Addressees of the online store can be defined as customers.

It is obvious that website design must be based on strong knowledge of specific target group or target market audience. To specificate a target market audience or target group is an important starting point for creating web pages. But it is clear that this specification is not a simple work. It can be stated that exact characterization of target segments is not possible at all. People differ in their characteristics, interests, orientation, etc. Many disciplines, such as sociology, psychology, etc. are dealing with customer profiles that are at ongoing changes because of changing environment.

For the purposes of this book we have chosen higher education sphere. There are several reasons for this decision. We did not need to look for respondents for our investigation. There are 73 universities in the Czech Republic. Their web-sites are available for everybody. It was not a problem for us to carry out research of all these web sites. Their target groups are similar, differing only in their interests of specific study fields.

Universities do not operate electronic business. Their websites serve only for their own self-presentation.

It is interesting, that all these universities can be seen as a large target market audience, for example, for suppliers of technical devices used in teaching process. Universities need these devices to support the teaching, and vendors use their own online stores to offer and sell these technical educational devices to universities.

Some elements of web sites and online shops can be examined in the university environment as basic elements of information management and marketing.

This book is divided into four main chapters. Each chapter presents the results of research carried out by the authors.

In the first chapter we discuss selected aspects of communication that should be respected when creating a website for universities.

In the second chapter we deal with the possibility of two-way communication that can be used by universities.

In the third chapter we are interested in the phenomenon of the recent times. These are social networks that form an environment for personal activities of individuals and also for marketing activities of companies, in our case - universities.

In the fourth chapter we perceive universities as a target market audience. We analyze its needs and requirements on information provided to them by suppliers of technical devices used in teaching process.

In conclusion we briefly summarize the results of our researches.

The present book is intended to all readers interested in non-standard views on websites and online stores. People interested in can be advised on what should be avoided when creating websites or online stores, and what should not to be missed.

1 Aspects of Communication in the Creation of Websites

Websites are originally based on hypertext links that allow for non-linear and non-sequential reading by letting one roll the cursor over a highlighted word and then by clicking the mouse, transition to an entirely different part of the text of the same or entirely different file, which can be stored on another computer in the network [37].

With developments in the technical possibilities of computers it became possible to replace parts of text with images, sounds or other media. It therefore became possible to use, for example, a picture instead of text, and after the above procedure go not to the text, but for example, to a presentation of sound samples or a film. This method is called hypermedia links.

Older representatives of hypertext documents (web pages) are so-called ”programmed textbooks“ that direct students to move to other parts, based on the accuracy of answers to questions [17]. B. F. Skinner and S. L. Pressey are considered the founders of programmed instruction, which was developed in 1954 [9].

1.1 From Programmed Learning to E-Learning

Programmed learning thus pre-dates the Internet, because the Arpanet computer network, which later enabled the development of the Internet, was created in 1969. At present, we can say that the Internet on the other hand, and especially Web sites, provide very effective support of programmed learning. Web pages were at the origin of e-learning and blended learning, which we will deal with.

1.1.1 Electronic Publications

Electronic journals, sometimes called e-zines, or books referred to as e-books, make up a very special parallel to web pages.

We can define an electronic text as a digital file with specific content, which is not necessarily merely a text file. It may contain, in addition to text and image content, navigation support [11].

The advantages of e-books include:

- Low costs - publishing electronic books and publications is economically feasible even for a small circle of readers, while printed publications are sometimes not sold out despite issuing just a small number.
- Simple to publish - e-publications can be published and distributed by the author and the costs are significantly lower than for other forms of publication.
- Availability - electronic publications can be made available via the Internet anywhere in the world. Effective copyright protection can be ensured with the help of the right software [10].
- Benefits for people with disabilities - is it possible to enable use of the computer program with the mouse or by voice command. For the visually impaired, reading of a written text is also possible using a computer program, etc.

The list of benefits suggests that the advantages of electronic publication are significant and indicate a positive prognosis for their future development. In this context, it should be noted that the electronic text, which may be equipped with multimedia extensions, is indeed a powerful and effective tool in the hands of teachers, but it is necessary to ensure that it is included properly in the learning process. In any case, it should not be considered a panacea and one should not proceed without a clear assessment of the concept of teaching [19].

1.1.2 Media Support

Educators can prepare tailor-made textbooks for students, into which they can insert multimedia applications (various media and interactive links). Links to other resources, located externally, such as on the Internet, can also be put into the publication.

1.1.3 Multimedia Support

Unfortunately, there is no clear interpretation of the term "multimedia." The authors have already dealt with an analysis of the term multi-medium and from the wide range of interpretations of this concept came to the most appropriate synthesis: Multimedium is a material-energetic carrier of information, containing at least three mutually independent feeds applicable either to or from a learning system. Of these, at least two lead toward the learner system and at least one serves to transmit the reaction of the learning system toward the system of instruction. Multimedia is a subset of hypermedia, which allows for the integration of different media types [4].

In other words, multimedia is the simultaneous use of multiple media (information channels), but at the same time requires two-way communication, which is a condition for multimedia. This type of communication in a computer environment is called interactive.

When teaching, the use of several media are mediated by didactic and technical means. A computer, which also provides interactive communication, is used to to control them [5].

A computer can control a variety of media. Firstly, of course, those that it manages through technical means. Furthermore, it can, using the appropriate interface, enable the transfer of information to use external technical educational resources. In turn, a computer program, perhaps with use of a computer network, controls the interactive communication [17].

1.1.4 Blogs

Blog make up a special form of web pages. These are sites where an author or a group expresses their opinions or ideas. A blog can be constructed so that it is possible for visitors to add comments.

1.2 Changes in the teaching process

It is undoubtedly worth considering the changes that have occurred even in the very process of reading.

There are two types of e-book:

- Describing events - following the sequence of certain events. Reading texts of this type is linked, on the part of the reader, with certain experiences, because the author is trying to take the reader and draw him into the action. An example may be fiction, prose, or poetry. Sequential access to the content is typical for this type of reading text. There is no need to take notes as all information is presented in the text with embedded media illustrations (photos, audio, etc.). The only thing needed is the ability to scroll through the text, set bookmarks, and have to possibility to continue reading from the same point at any time later [41].
- Textbooks, encyclopedias, technical papers, etc. - Although this type of text can be read sequentially, one often works with text on the basis of its content or the index on a particular page, which contains specific information, explanations, or analyses of the particular situation. Rather than reading in the true sense of the word, it is a consultation. When working with a text of this type, there is more need for the ability to take notes on the content, highlight the most important parts of the text, easily locate specific parts of the text relative to the specific problem, place bookmarks in order to easily return to a specific location, etc. There is a clearly felt need for interactivity when working with this type of text. One needs to easily move from a point in one

text to another place in other texts. We need to compare information from different sources, and add to them, which is not possible with a classical (paper) text [7].

1.2.1 Using Equipment

General-purpose devices capable of working with electronic publications include mainly personal computers (PCs), laptops, etc. Files with electronic publications are loaded into the device via the Internet, CD-ROM drive or storage media.

The use of so-called electronic book readers (e-book readers) is very convenient. One of the best at present is the Amazon Kindle, whose main advantage lies in the high contrast between the text and the background, and in particular the fact that the monitor is not lit. This not only saves energy increases the duration for use (up to 4 weeks), but also protects the eyesight [47].

1.2.2 Websites as a Tool for Communication

In terms of the fundamentals of communication basics, websites offer one-way communication. For minimal two-way communication, it is necessary to change the web pages to include, for example, at least one optional element that the sender will evaluate. This may be, for example, counting the number of visits to individual parts of the website, or inserting simple questionnaires using closed responses. This not possible, however, using only the basic programming language HTML (HTML stands for Hyper Text Markup Language). Using HTML, we can only create a basic static document using text and still images with hypermedia or hypertext links that move users to a different location on the site or to other static or dynamic pages [13].

HTML files do not allow programmed calculations, decision making, etc. Thus, HTML cannot even be used for counting the number of visits to a site. This requires a different programming language, such as PHP, Javascript, etc.

Using two-way communication, such as polls, leads us to newsgroups, an internet service. There is a time delay in feedback with any two-way communication through a website, because as opposed to oral communication, with written communication there is always some delay [20].

Newsgroups, interest or discussion groups, are very similar to mailing lists. However, there is a difference in the overall procedure, such as the manner of registering, logging in and utilizing the environment. Websites are generally used for newsgroups, where they form a kind of accessory. There are other specific possibilities that are off topic here and will not be mentioned [8].

Chat is a typical example of a newsgroup. Registration is required to participate in some chats, elsewhere it is not necessary. It depends on the author of the chat and its objectives.

In any case, it is necessary to ensure security for the whole chat. The Internet environment is full of different automatons that store unwanted materials, advertisements, and entries of often dubious nature and undesirable quality, etc., wherever they may be stored. To connect or to register to the group, therefore, images of senseless texts with deformed letters are used, which an automaton is not able to decipher. Without copying the text, the sender of the communication can not save the entry in the chat. This is the primary defense. A secondary defense is the ongoing monitoring of the entire chat by a person who removes inappropriate entries or entries by problematic or mentally ill authors. Just visit any chat and the sense of the above we will be obvious [14].

In terms of teaching, newsgroups can be used, for example, to solve a task that is given to a group of students, while the teacher can oversee the communications leading to its solution. He or she can elect to intervene in the procedure, or just monitor and evaluate the activities of individual students. To use this method it is useful to ensure some security through an information system or business intelligence, which does not allow access from someone who is unregistered.

Newsgroups are bi-directional communication with more or less time-delayed feedback. They can, however, also act in one direction, such as for a sociological survey of a chat on a web portal.

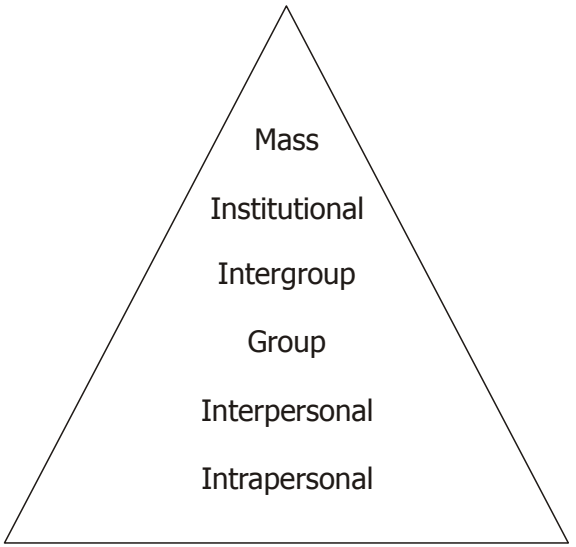

Fig. 1.: Communication pyramid according to D. McQuail [11]

Due to the necessity for brevity (length of entries is limited) this communication is only written, with no possibility for using visual forms. It is coded communication that may be difficult to interpret, and could lead to its being misconstrued and to the emergence of communication noise.

In terms of types, it may serve as interpersonal or institutional communication, but rarely societal.

According to D. McQuail‘s pyramid of communication types, websites are used to communicate to groups or to society as a whole, (see Fig. 1).

1.2.3 Communication Quality and Possibilities

In our research we deal with the quality of website content in terms of communication with the user – in other words, from the perspective of the target groups of visitors to these sites. In this article we focus on checking the skills and knowledge of websites authors. The target group of the examined websites includes those interested in studying at universities in the Czech Republic.

The Czech Republic has been experiencing a decrease in population, which has resulted in a decrease in the number of students interested in studying at secondary schools and universities. Each university needs a sufficient number of students to justify its existence, and all universities must attract those students in an appropriate and lawful manner. Therefore electronic communication between schools and prospective applicants for study is of increasing significance. An important aspect is the perception of the interests of the target group.

A list of all colleges and universities was obtained from the website of the Ministry of Education, Youth and Sports on 30 June 2012.

Of the total number of 74 schools, we were able to examine 73 web sites as one web page does not exist. We consider the number of 73 as 100 % of all schools as of the starting date of our website research, which was conducted from July 7, 2012 - July 20, 2012.

The hypothesis was that the websites of colleges and universities support all routinely used forms of communication. This reflects the website creators' knowledge of communication possibilities [2].

To avoid possible objections to favouritism or, conversely, damaging a school's reputation, we decided to publish the data anonymously.

Accurate and specific information, including the names of the schools, are part of the archived research materials.

1.2.4 Website as Promotion for Colleges

Electronic publicity is one of the cheapest and relatively easiest forms of promotion; however, it cannot exist on its own. It must be implemented in conjunction with other components of the communication mix for colleges and universities [32].

Each school has its own website, which is part of its presentation to the public.

The role of websites for colleges and universities can be characterized in two ways:

- Voluntary provision of information – the school is interested in communicating with prospective students or the general public. If this option is perceived only formally, the school prepares itself for relatively broad possibilities in providing information to the target market segment, thanks to which it may in fact exist. Most private colleges have already understood this, so they try to expand, rather than simply maintain, their target segment.
- The provision of mandatory information - certain information, such as the procedure for the creation of annual reports, must be published on a school's website. This information is determined by various legal regulations.
- In our research, we focus exclusively on communication options, which, in our opinion, the target segment requires.

1.2.5 Selected Parts of Our Research

In our research, we assessed only the existence of particular services, information, etc. If we wanted to also evaluate quality, the research would be far more complex and time consuming. From this perspective, the results published here are to be understood as part of the pilot phase, in which we specify the next phase of research.

From the beginning, we examined sites from the perspective of prospective students. We formed a certain opinion about what we, as prospective students, would want to find on a college or university

website. We further clarified this according to the information found on the researched websites, thus reducing the possibility of mistakes. If we omitted certain information initially, we returned to it as soon as we came across it on several websites. We then returned to search for the same information or services again on all web sites. We therefore proceeded similarly to a search engine in the Internet environment. The only difference is that we were interested in the frequency of the occurrence of information and simultaneously statistical error, characterized by estimated standard error and a 95% confidence interval.

In next section we present the reasons for establishing the existence of information or services. Collected data are presented in Table 1. We present a statistical evaluation using estimates of standard errors and confidence intervals. We chose a 5% significance level, meaning 95% confidence interval.

1.3 Research Support for Various Forms of Communication

In the research presented here, we focused on different forms of communication. Prospective students want to, for example, inquire about something specific or prefer communication in a foreign language. Alternatively, they might need support in finding information (search keywords). This is understood here as a special form of communication.

1.3.1 Search on the Website

Visitors to the website can enter a search word and the corresponding program then displays all related occurrences in all contexts. We consider this as strong support for the website visitor [29].

1.3.2 Languages Used in Websites

The importance of multiple languages on a web page can be seen in two ways. First, prospective students can see that the school considers foreign languages to be very important.

The second way is related to the fields of study at the school. At many universities and colleges, instruction is also conducted in English, for example. The school must present itself to foreign prospective students in a language they understand well, or in the language they wish to study. It is also important to consider the possibility of cooperation between universities, where foreign universities can obtain important information about the school before offering to cooperate with them. Among other things, this may include student or teacher exchanges through the international Erasmus program.

1.3.3 Information on Telephone and Fax Numbers

Provision of telephone numbers and fax numbers allow one to choose one of these basic options when selecting two-way communication. Telephone connections have certain modifications that can be very beneficial for prospective students. For example, there can be a toll-free phone number (an “800” number), or a telephone line to enable communication through Skype.

A mobile phone number sends a certain signal to prospective students. It can be assumed that a mobile phone will be more accessible and more advantageous in terms of time. Prospective students may also enjoy discounts on calls when using services provided by the same mobile operator.

1.3.4 Version of Websites for Mobile Phones

Websites for mobile devices have a different design than regular websites. Although their content is the same, they differ in the way they share information with the recipients. For mobile devices in particular there is a clearer arrangement of data with regard to the

significantly smaller size of monitors. Optimization of the transmitted communication is important to avoid the need to transfer large data streams. If the website is not designed this way, it can still be used on appropriate mobile phones, but quality may be negatively affected [24].

1.3.5 Information on E-Mails

Communication via e-mail is important for both parties. It may be a quicker and more direct way to reach the right person than by telephone. Furthermore, e-mail is almost free.

For persons that provide their e-mail address on a web page as a link to an e-mail client (eg MS Outlook or Mozilla Thunderbird), or as a text, there is some risk. So-called software robots search the internet for accessible e-mail addresses and sometimes overload them with various ads, images, or links to web pages, mostly with erotic content. There is also a greater risk of infection from a computer virus [35].

The simplest and also a sufficiently effective defense against the activities of these robots lies in the method of publication of the e-mail addresses. They should be displayed as part of a picture. The current robots are not able, and hopefully will not be able, to decipher them. In this case, however, the email addresses must be rewritten by the person who wants to use it to communicate, as it cannot be simply copied [34].

Another possibility is to use a form, for which there may be one or more options:

- To specify the address of the sender's e-mail, which is then checked.
- To retype a combination of several characters from a picture, thus a sort of server-generated password.

In our research, we examined how the web site authors dealt with communication via email and whether the e-mail addresses were secure.

1.3.6 Newsletter

There are several forms of newsletter, which provides some information about events at the university or college. One of the basic, cheapest and simplest forms is sending current information on a flyer via e-mail. The same is possible through regular mail, but is relatively more expensive and less effective.

1.3.7 Other Forms of Communication

We consider other forms of communication as those that are only available on the Internet [12]. These are, for example, social networks, whose use was divided into Facebook and others. We also investigated the possibility of using Second Life, a simple virtual reality environment.

1.4 The Results of Practical Research

The results of our research into the support of various forms of communication used by Czech universities and colleges on their websites (for prospective students) are summarized in Table I.

Shaded values in the table indicate that the observed data can be regarded as sufficiently reliable. The data are located within a 95% confidence interval. The value obtained (greater than 50%) indicates that the majority of Czech universities either use or do not use the given possibility.

Table 1.: Results obtained on the support of various forms of communication on university websites – search engine for communication support

Evaluated element	Used [%]	Not used [%]	Standard error of estimates [%]	95% confidence interval [%]
Search engine for the sites	82,2	17,8	4,5	73,4 - 91,0

Source: authors

Table 2.: Results obtained on the support of various forms of communication on the websites of universities – language of communication

Evaluated element	Used [%]	Not used [%]	Standard error of estimates [%]	95% confidence interval [%]
2 or more language versions	84,9	15,1	4,2	76,7 - 93,1
3 or more language versions	21,9	78,9	4,8	68,6 - 87,6
Czech version of the site	97,3	2,7	1,9	93,5 - 100
English version of the site	84,9	15,1	4,2	76,7 - 93,1

Source: authors

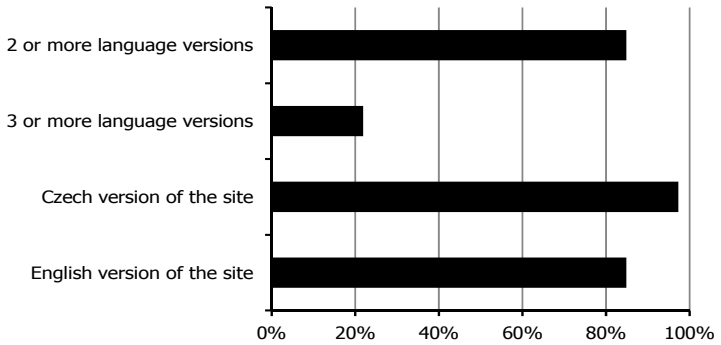

Fig. 2.: Graphic presentation of the survey results – language of communication. Source: authors.

Table 3.: Results obtained on the support of various forms of communication on university websites – web pages for mobile phones

Evaluated element	Used [%]	Not used [%]	Standard error of estimates [%]	95% confidence interval [%]
Web for mobile phone	2,7	97,3	1,9	93,5 - 100

Source: authors

Table 4.: Results obtained on the support of various forms of communication on university websites - forms of telephone communication

Evaluated element	Used [%]	Not used [%]	Standard error of estimates [%]	95% confidence interval [%]
Telephone number for a land-line	95,9	4,1	2,3	91,3 - 100
Toll-free telephone number	6,8	93,2	3,0	87,4 - 98,9
Mobile Phone Number	17,8	82,2	4,5	73,4 - 91,0
Possibility of free SMS	0	100	0	100
FAX number	56,2	43,8	5,8	44,8 - 67,5

Source: authors

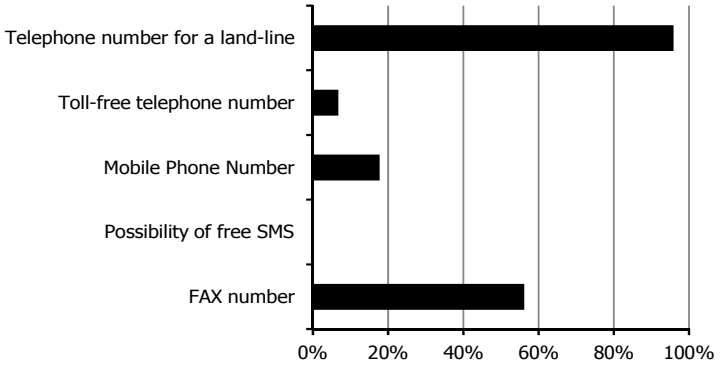

Fig. 3.: Graphical presentation of the survey results – forms of telephone communication. Source: authors.

Table 5.: Results obtained on the support of various forms of communication on university websites – issuing newsletters.

Evaluated element	Used [%]	Not used [%]	Standard error of estimates [%]	95% confidence interval [%]
Issuing newsletters	32,9	67,1	5,5	56,3 - 77,9

Source: authors

Table 6.: Results obtained on the support of various forms of communication on university websites - forms of support for e-mail communication.

Evaluated element	Used [%]	Not used [%]	Standard error of estimates [%]	95% confidence interval [%]
Inclusion of e-mail addresses	95,9	4,1	2,3	91,3 - 100
E-mail as a hypertext	79,5	20,5	4,7	70,2 - 88,7
E-mail as regular text	15,1	84,9	4,2	76,7 - 93,1
Form for e-mail	11,0	89,0	3,7	81,9 - 96,2
E-mail address in an image	5,5	94,5	2,4	89,9 - 99,1

Source: authors

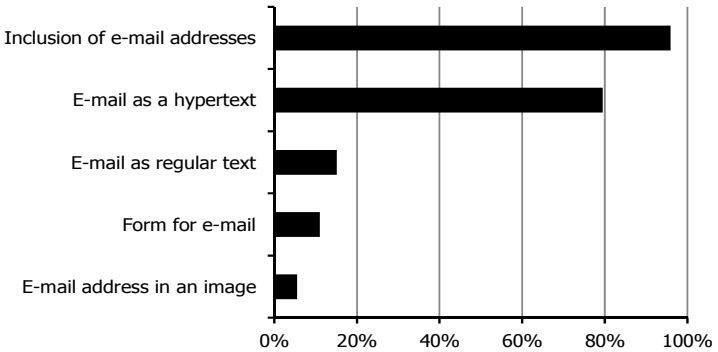

Fig. 4.: Graphical presentation of the survey results - form of support for e-mail communication. Source: authors.

Table 7.: Results obtained on the support of various forms of communication on university websites – forms of communication using Skype and ICQ

Evaluated element	Used [%]	Not used [%]	Standard error of estimates [%]	95% confidence interval [%]
Communication through ICQ	1,4	98,6	1,4	96,0 - 100
Possibility to use Skype	87,7	12,3	3,8	80,1 - 95,2
Skype communication free	16,4	83,6	4,3	75,1 - 92,1

Source: authors

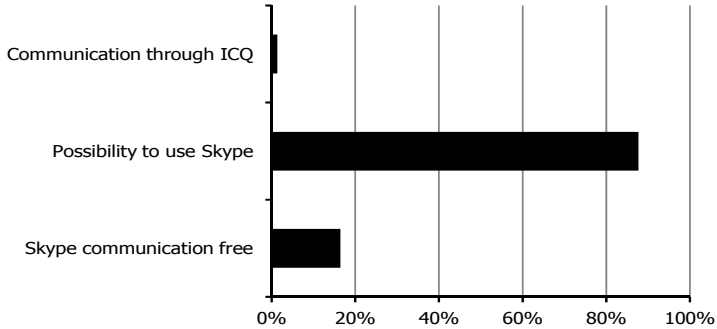

Fig. 5.: Graphical presentation of the survey results – forms of communication using Skype and ICQ. Source: authors.

Table 8.: Results obtained on the support of various forms of communication on university web sites – using types of social networks for communication

Evaluated element	Used [%]	Not used [%]	Standard error of estimates [%]	95% confidence interval [%]
Facebook	63,0	37,0	5,7	51,9 – 74,1
Twitter	17,8	82,2	4,5	73,4 – 91,0
LinkedIn	2,7	97,3	1,9	93,5 – 100
Google+	8,2	91,8	3,2	86,5 – 98,1
MySpace	1,4	98,6	1,4	96,0 – 100
Forsquare	1,4	98,6	1,4	96,0 – 100
Virtual reality (SL)	1,4	98,6	1,4	96,0 - 100

Source: authors

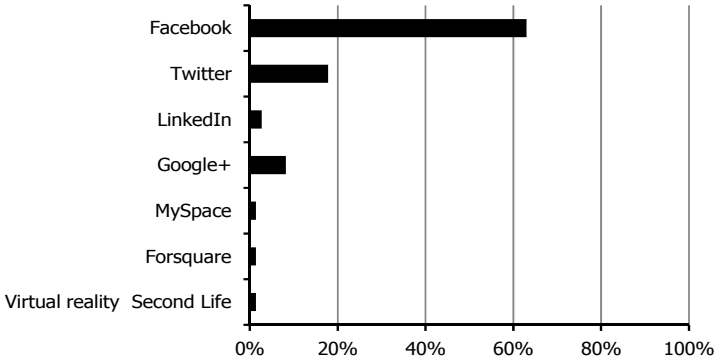

Fig. 6.: Graphical presentation of the survey results – using types of social networks for communication. Source: authors.

1.5 Conclusion of Communication Aspects in the Creation of Websites

Our hypothesis was refuted within statistical confidence limits for some forms of communication. Websites of Czech universities and colleges do not support all possible forms of communication.

Full results are given in Table 1. 82.2% of Czech universities and colleges use search engines on their websites to search for keywords.

Languages on websites are at a good level. In 84.9% of cases, there are several language versions of the website.

Not all web pages contain explicit information about telephone numbers and other forms of telecommunications connection. Sites usually contain information about telephone (95.9% of cases) and fax numbers (56.2% of cases).

A toll-free phone number is available in only 6.8% of cases. Mobile phone numbers are listed in 17.8%.

The possibility to communicate through Skype (used by 87.7% of schools) is limited to paid calls (only 16.4% offered the possibility in the form of free calls for customers).

In only 2.7% of cases are there versions of web pages customized for mobile phones. From the perspective of today's information technology, this is a very low number.

E-mail addresses for employees on the schools' websites are not adequately protected against software robots (79.5% of schools do not use even the simplest protection options).

Colleges do not use newsletters to communicate with prospective students (only 32.9% of cases).

Social networks are used as other forms of communication (Facebook in 61.6% of cases, other in 79.5% of cases).

Virtual environments such as Second Life are used in only 1.4% of cases.

On the basis of the data collected, we would recommend that Czech universities and colleges adjust their communications in order to take full advantage of the possibilities that were identified on the web pages examined.

2 Possibilities for Two-Way Communication on Czech University Websites

In order for businesses and universities to benefit, it is important for them to use two-way communication to gain feedback from their target markets. The use of a website is one of the simplest and least expensive ways to obtain this feedback and determine the opinions of their target markets.

Every university provides services. Every university student can be considered a customer of a company which provides services in the field of teaching and education.

A higher education institution must perceive marketing as part of its business, just as any other company does. Every potential customer as well as every student in the case of a university, needs accurate and detailed information about the service offered, i.e. a product in which he is interested. Similarly, every manufacturer of a specific product needs to know whether there is an interest in his product, how consumers assess it (in this case students), how to effectively and positively influence the life cycle of a product, how to get and keep customers, etc.

The acquisition of necessary information results from a variety of forms of communication, which is called marketing in this context. Each of the forms of marketing communication has its own specific rules, which are based on the specific goals of the service provider. Achieving the objectives is based upon excellent knowledge of all aspects of communication and mentioned rules [26].

As a simple example we can mention the product advertising and marketing survey research. For outsiders, it might seem that advertising is only one-way communication, and marketing research communication is two-way. But this is just an illusion. Only one-way communication without knowledge of context and without feedback is

risky. It can negatively affect not only the product itself, but also future existence of its producer (author).

Exclusively one-way communication in this case would lead to ignorance of the reactions by the recipients of advertising messages; the sender (product manufacturer) would not know how potential customers react to the advertising. The sender of advertising would not know whether the ad is effective, whether the product attracts any interest, etc.

2.1 Preparation of Marketing Communication

The selected target market segment (prospective students) is addressed by the university through appropriate communication means; the communicated message should include the description of the product, its price and a distribution method. At the same time, the university apparently wishes to get a feedback so that it can assess the response to the service provided as part of its market research. It complies with certain unwritten rules to optimize its marketing communication.

The author of a marketing communication should solve the following tasks:

- To determine who is the receiver of the communication, i.e. the target market or its segment.
- To establish communication objectives.
- To create a message/communication which he intends to pass. In the beginning it is only a conceptual design, which can be related and adjusted to the later choice of communication mix, size or budget.
- To choose the appropriate means of communication (media).
- To set a total budget for promotion.
- To establish a communication mix.

- To establish a system for measuring the effectiveness of advertising.
- To manage and coordinate the entire process of marketing communication.

The procedure for performing these tasks as a whole is outlined in Fig. 7. From the perspective of this article it seems unrealistic for us to handle all the tasks. Each university is likely to have different objectives, starting with specific properties of the target market segment, through the results of the SWOT analysis, the aims of marketing communication, budget costs, the choice of communication mix, to the data resulting from other parts.

For us it is only important what is common to all universities, and what it is we can compare and evaluate. Clearly, these are the common properties of the selected target market segment relevant for every university, and the uniform use of electronic communications in the communication mix ingredients. The uniform use of electronic communication, as understood in this paper, is the operation of university web sites.

Ensuring the smooth operation of its website is one of the fundamental duties of every university. One website can be a dual tool of, for example advertising and public relations, which are otherwise fundamentally different components of the communication mix [4], [15].

The term “target market segment” in our case covers prospective students. They differ from each other in a variety of features that are obvious (eg, gender, age, etc.), and also by indicators, which at first sight cannot be reliably estimated (eg psychological characteristics, physiological properties, health, etc.), and in some cases some indicators can be intentionally concealed (eg diseases) [35].

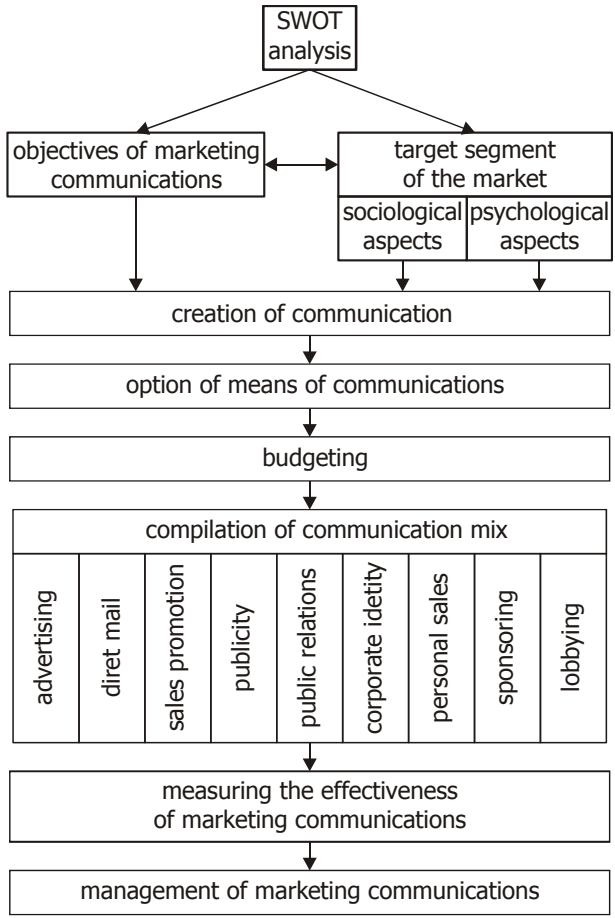

Fig. 7.: The chart of preparation, development and management of marketing communications [11].

In terms of marketing communication it is necessary for a school to know the most accurate and reliable characterization of the groups they would like to address regarding their product and other related services. These groups are referred to as target segments. The target market segments continue to feature differences in individual persons, but can also be traced to certain, precisely definable different types of

individual segments. For those interested in studying at a university, one can most likely expect a higher than average intelligence, a completed secondary education, and an interest in a particular field of study.

Marketing electronic communication of universities for individual market segments is usually based on the same foundations. Very important is the focus on individual customers/clients, which is an advantage of every e-business, in our case the university website.

Part of the initiative is yet left upon customers - prospective students - who may, through quality two-way communication, choose the right product, or the branch of study at a particular university

This initiative can be used by the university for its marketing survey. The university can, with minimum costs, get a feedback from its website´s visitors. It suffices only to launch a questionnaire inquiry, and ask the visitor for his opinion. Another option is provided by similar monitoring visits at subpages, which provides a certain opinion of the site visitor even without his knowledge or awareness.

If a university is interested, it may, in some cases and pre-defined manner, modify the final format of the product offered according to the feedback expressed by prospective students in their communication with the university [17].

For example, if there is an interest in a finer specialization of the field of study, the university can offer, in accordance with its accreditation, certain elective subjects that will support the desired specialization.

We have tried to suggest that a good website is not only a “dead” means of one-way communication in terms of Shannon-Weaver's transmission model (see fig. 8).

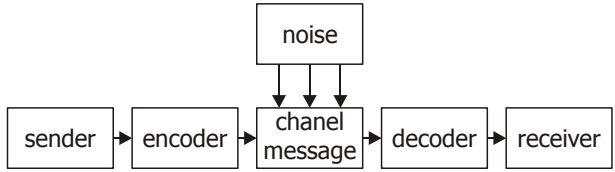

Fig. 8.: Shannon – Weaver model without feedback [12].

We can assume that in university websites, those searching for information are primarily intellectually mature individuals, even though they may have different interests or be from different social groups, etc. Therefore, it is to the advantage of every university to use their opinions, at least for inspiration and feedback on their activities [11]. The Shannon - Weaver transfer model is then changed by adding feedback (see fig. 4).

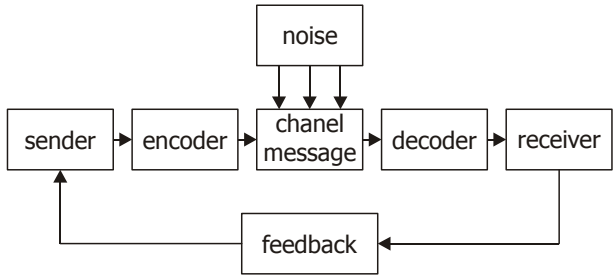

Fig. 9.: Shannon – Weaver model with feedback [12].

In our research, we studied select assumptions regarding the quality of communication through websites. We must base these assumptions on knowledge of the target market segments that the websites should be tailored to. Likewise, we must build on the principles of marketing, although we will not discuss them here as a whole or in detail [27]. We focus mainly on selected chapters of marketing communication in an electronic environment.

2.1 Marketing Mix from a Customer´s Perspective

For every university it is necessary to obtain its customers - students, without whom it could not exist. For this reason, it should try to satisfy them, ie provide them with the maximum value they may expect [36], [12].

This does not mean that a university should admit anyone and allow everyone to graduate regardless of the quality of his or her knowledge. We can assume that after the initial manifestations of such efforts, and more employers begin to evaluate the quality of graduates, they will also have more experience in this regard, and "paper" education will cease to have any significance. This is not advantageous even for individual schools. Theoretically, it could happen that graduates of some "well-reputed" schools will be compared to graduates of other schools, and have difficulties in finding a job [47], [22].

Universities must meet both their goals, one of which is commercial in the case of private universities. However, the goals must be determined as responsibly and compatibly with the requirements of the Accreditation Commission as possible. The Accreditation Commission is not interested in the income or profits of the university, but in the quality of education provided [2].

The marketing mix oriented towards the customer has different features than the original marketing mix 4P-oriented towards a company (seller).

For the customer universities, ie for a prospective student, 4C marketing mix means the following:

- Customer value: it is a price that the product has for the customer himself, in other words, the price which the study has for a student (or prospective student). It can also be expressed financially, such as the amount that a potential student is willing to pay for their studies. The sums need not necessarily reflect only the tuition fee; they can also include the loss of earnings during the period of

study. A high school student can calculate the amount of money he or she may lose during the period of university study, and to compare the amount with earnings he or she may reach after graduating from a university. In the case of a public university, the amount may be considered an equivalent of the tuition fee; in the case of a private university, it will be added on top of the tuition fee. The calculation will depend on the amount of expected and potential earnings after graduation [32].

Mostly, and in the case of public universities almost overwhelmingly, the value is also represented by the acquired knowledge, skills and competencies, and opportunities for students. In terms of the school, this is included in the profile of a graduate from a particular field of study, whereas the profiles for the same fields of study at different schools may vary, by for example, the specific focus of the industry. For the student, it is important to know that the graduate profile is one of the first criteria that the Accreditation Commission assesses in each application for accreditation. The student may also, if necessary, to return to the profile if he finds any discrepancies in the implementation of the curriculum [18]. One can argue about the quality of the implementation of the curriculum in a field of study, which the respectability of the school is subject to up to the moment it comes under external inspection. Also playing a role here are didactic resources, which can facilitate learning and thus increase the customer value of a particular field of study of one university against another that does not utilize them. (The use of teaching resources depends on the choice of the teacher, however, and cannot be imposed.)

- The costs of the product: they arise exclusively on the part of the customer and are associated with the product, its operation, etc. This group includes travel or commuting costs, accommodation, etc. It also includes the cost of necessary equipment, such as a computer, Internet connection, purchase of textbooks, etc.

- Customer´s convenience: it is represented by the availability of the product, the need for its transportation from the supplier, waiting for the delivery of the order, etc. In the case of universities it includes the availability of universities in terms of available transport or accommodation [30], [29]. For combined or distance study programme, it is especially relevant whether the university provides academic support, textbooks, etc.; it can be crucial whether the university arranges for sufficient number of consultation hours, testing, etc., in the time and manner consistent with the needs of students. An important role may be played by a quality e-learning program [34], [8].
- Communication: the level of communication between the university and a potential applicant for study plays a crucial role. It is important that such communication technologies are employed which are preferred by a student. Communication must be rapid, quality and two-way in terms of the transmission model as early as at the stage of providing initial information to the prospective students in the beginning of the application procedure. This is quite obvious in the case of private schools. It can be assumed that a potential student is acquiring a certain idea of what he or she intends to study and then decides which educational institution to choose [10], [42], [46].

One objective of our research was to examine whether the wide range of possibilities available in the Internet are used; whether the target market segment is provided continuously with updated information which is presented dynamically or statically. Suitable examples may include study materials, e-learning, etc. However, examples must be fully exposed demonstrations, not only some demo-versions trying to show just one segment of some educational institution, such as one piece of study material offered by the school [20], [19].

For the sake of completeness, we add that the customer-oriented marketing mix is called the 4Cs:

- Customer value (benefit for the customer - utility).
- Cost (customer costs in relation to the product).
- Convenience (product availability, customer convenience).
- Communication (communication of the company with the customer).

2.2 Marketing Communication of Universities

In our research, we have concentrated on selected basic aspects of, and rules for electronic marketing communications. The research was performed in all universities in the Czech Republic.

Electronic marketing communication of every university is carried out in particular through its website. The research we focused on websites of all universities, regardless of their founder or status [5]. As mentioned above, each school focuses on getting students to study their programs and courses.

We were interested in a comparison between state, public and private universities - whether the communication is complete in terms of content, whether it is accessible to prospective students as customers who seek it, and whether it provides standard and important information [38], [14].

Each university has its own website, which is part of its presentation to the public. The role of a university website can be characterized in two ways:

- Voluntary provision of information: the university is interested in communicating with prospective students, or the general public. If this option is perceived only as a formality, the university deprives itself of a relatively wide range of communicating information to their target market segment, which allows the university to exist. Private universities usually identify and

understand their target segment and try to at least maintain it, if not to expand it [6].

- Providing mandatory information: the university has a duty to publish on its website certain information, which is imposed by different legal regulations, such as their annual reports.

In this study we tried to focus on the information provided which a target market segment common to all schools would probably require. This information relates to the aforementioned marketing mix from the customer perspective (prospective students). Disclosure of this information is included in the promotional activities of each university.

Electronic communication of universities can take place in various ways and by various means. We were interested in communication especially in the Internet environment, which can also be transfered for use by other means than a standard computer, e.g. some mobile devices. But we were also interested in what other environments and website services, such as telephone networks, etc. were offered by the schools.

2.3 Research Support for Two-Way Communication

Market research and its benefits for universities were already mentioned in the section on the target market segment - potential students. Here we would like to mention it in connection with the research conducted into the websites of all universities in the Czech Republic.

The university can use its website with minimum costs to get feedback from its visitors. It suffices just to carry out a questionnaire survey and to ask visitors about their opinion. It is possible for free, or for insignificant fee using external companies, to monitor attendance in all parts of their site.

We tried to investigate how many universities routinely use this option, and in what way.

2.3.1 Marketing Research Using Websites

As has already been mentioned, every university can use the environment of their websites to carry out one, long-term or repeated marketing research to satisfy their needs.

The implementation of such surveys is relatively simple and inexpensive. It is possible to incorporate into the website itself such an inquiry, and the site administrator can easily change it as needed.

From the professional point of view such activities can be described as technically simple, dependent mainly on the efforts of commissioned employees. However, the results can be surprisingly effective.

We will now focus on the select options for two-way communication, through which it is possible to secure marketing research.

2.3.2 Passive Survey Using Websites

A passive survey through a website can be done by any experienced programmer who works in PHP, JavaScript, etc. It means just installing the web-counter. This simple counter can then be placed on all subpages of the website of a university. Even if it were placed on the website only as an ornament, it would continuously carry out its task until cancelled. It will register the interest of visitors not only in the website but it can also locate an interest in a specific subpage, in which it may be, for some reason, an important factor. It is, for example, possible to track interest in various fields of study.

It is also possible to use the services of companies which, after conclusion of necessary agreements, evaluate the visits by themselves at regular intervals and surrender the observed data to the university. It is possible to check the data several times a day under the access permissions to the web server.

2.3.3 Research Hypotheses

Marketing is a matter for every university. There are differences between state, public and private universities, which is clearly reflected in their particular in marketing activities.

We focus on the research of such two-way communication, which is done through the web pages of a university.

The basic hypothesis is that each university conducts the marketing research through its website.

We assume that the web sites of universities use appropriate forms of two-way communication to obtain relevant information from prospective students. These forms include web-counter, guestbook, FAQ, chat, a questionnaire survey, etc.

2.4 The results of Practical Research

A survey using webpages can be done in a passive or active manner.

2.4.1 Passive Survey Using Websites

During the research, we found out that a web-counter placed in some form on a website is used by just 6.8% of universities (only 5 schools). The observed data can be considered as sufficiently reliable. Most Czech universities have no visible web-counter on their websites.

Invisible web-counter does not mean that the university fails to use it. It can, however, be regarded as an error, as the number of visitors is an indicator of interest in the website and thus in the university itself.

During the research, we found that one university had placed the web-counter on the subpages of its website. This represents 1.4% of the total number of universities (98.6% of universities are without a subpage-counter). The observed data can be considered as sufficiently reliable. Most Czech universities have their subpages without any visible counter.

2.4.2 Active Survey Using Websites

An active exploration requires the preparation of a survey, its organization and evaluation. It is a matter of time rather than complexity. Some of the employees must be commissioned to regularly and frequently monitor the course especially of certain activities.

- **Polls on the website**

The location of a questionnaire on the website does not constitute a major technical problem. Some universities obviously used the content management system for creating and managing webpages. It can even be a freeware. These systems have considerable flexibility regarding the organization of questionnaires. They can also be set as automatic conducting of an ongoing statistical evaluation.

Statistical surveys can be outsourced to an external contractor, with the university placing the link on its website. It can be assumed that the participation in a similar survey would be highly dependent on the "visibility" of the link and the banner referring to it, such as few sentences or a picture.

During the research, we found out that only 4.1% of universities have interest in the questionnaire to be placed on their website (95.9% are not interested). The observed data can be considered as sufficiently reliable. Most Czech universities do not place any polls on their websites.

During the research, we found out that the number of local and outsourced surveys was similar. The local alternative, according to our findings, was chosen by only 2.7% of universities; outsource services were chosen by 2.7% (in both cases, 97.3% of schools do not use this option).

The observed data can be considered as sufficiently reliable. Most Czech universities take advantage of neither local nor outsourced surveys.

❖ Chat, discussion groups on the website

The chat and discussion groups on the internet serve basically similar purposes. Even though many of us have rather negative experience with similar activities, it is appropriate to give them adequate attention.

Negatives can be summarized under the open access of anyone from the internet environment. With no or inadequate protection chats or newsgroups in a particular website are overwhelmed with an incredible amount of perversity and writings by people with inadequate IQ. The areas or topic of a website is irrelevant, only the number of participants changes.

Chat and discussion group can be quite effectively protected in several ways. One example is to require the user to copy a (not written) code. Another way is to make it necessary to register before posting a message. On this matter, we tend lean toward protection using a code. Registration is not the best option for students because it may deter some serious visitors. Copying a code, however, can be regarded a sufficient way to reduce the number of attacks by spam robots. Conversely, regularly entering registration information can in fact lead these robots to the site. This can happen when the visitor saves his details for further use in Windows. It should be noted that similar considerations can lead to paranoid levels of protection. So we settle for a copy of the code as sufficient security.

During the research, we found that only 2.7% of universities have a chat on their website (97.3% do not use it). The observed data can be considered as sufficiently reliable. Most Czech universities do not take advantage of communication through a chat.

During the research, we found that access was protected only in one case, ie 1.4%, and registrations (98.6% of university do not have protected access). A copy of the code is used in chat by no university. The observed data can be considered as sufficiently reliable. Most Czech universities use unprotected access chat to communicate within their environment.

A guestbook is similar to a chat; it puts more emphasis on the communication between the publisher (university) and website visitors. A chat expects communication among any persons, without a stronger order.

During the research, we found out that there is a guestbook at 16.4% of universities (83.6% of universities do not use it). The observed data can be considered as sufficiently reliable. Most Czech universities fail to take advantage of positives provided by a guestbook.

In research we found an interesting thing: 8.2% of universities solve the security of their guestbook in such a way that it is impossible to write in it. However, it is possible to write an email to the administrator. If he considers it appropriate to publish a response to it, he would publish the question and answer in the appropriate section of the website. This procedure is technically called FAQ. Conversely speaking, 91.8% of universities do not use it. The observed data can be considered as sufficiently reliable. Most Czech universities do not use FAQ.

Table 9.: Results use of two-way communications on the websites of Czech universities – visitors counter and questionnares.

Evaluated element	Uses [%]	Not used [%]	The standard error of estimate [%]	95% reliability of interval [%]
Visitors counter on the main page	6,8	93,2	3,0	87,4 – 98,9
Counter of visits also on subpages	1,4	98,6	1,4	96,0 – 100
Questionnaire survey	4,1	95,9	2,3	91,3 – 100
Local questionnaires	2,7	97,3	1,4	94,6 – 100
Questionnaires outsourced	2,7	97,3	1,4	94,6 – 100

Source: authors

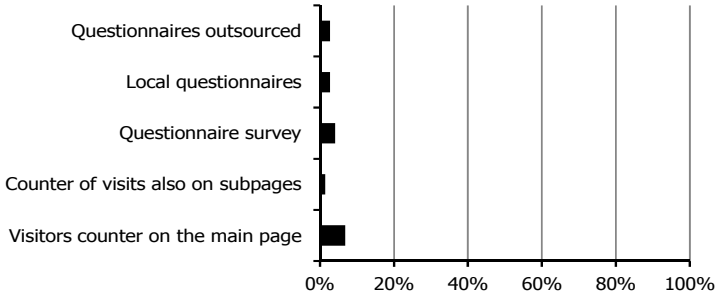

Fig. 10.: Graphical presentation of the survey results. Source: authors.

Table 10.: Results use of two-way communications on the websites of Czech universities – CHAT, Questbooks, FAQ.

Evaluated element	Uses [%]	Not used [%]	The standard error of estimate [%]	95% reliability of interval [%]
Total of Communication CHAT	2,7	**97,3**	1,4	94,6 – 100
Communication CHAT protected	1,4	**98,6**	1,4	96,0 – 100
Guestbook	16,4	**83,6**	1,3	75,1 – 92,1
Using FAQ	8,2	**91,8**	3,2	85,5 – 98,1

Source: author

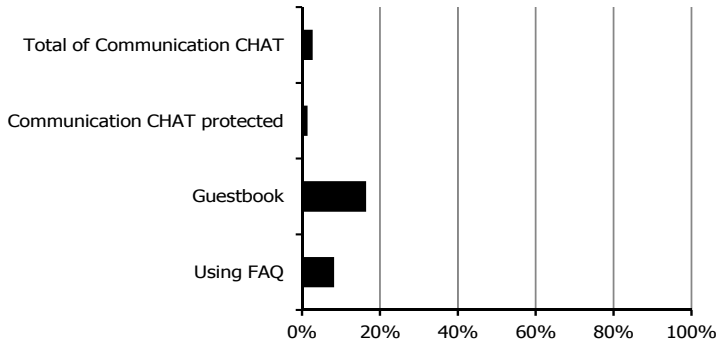

Fig. 11.: Graphical presentation of the survey results. Source: authors.

2.5 Research Results of Two-Way Communication

The outcomes of research in how Czech universities use the possibility of marketing surveys through their websites, are summarized in Table 1 and 2.

The shaded values in the table indicate that the observed data can be regarded as sufficiently reliable. The data are located in the 95% confidence interval. The value obtained (greater than 50%) indicates that the majority of Czech universities use or do not use this opportunity.

The research into the two-way communication on the websites of all Czech universities shows that its potential and options are not used. The statistical method has proved that our research data are very reliable.

Czech universities deprive themselves of the possibility how to easily and cost-effectively seek the views of the target groups of customers - their potential students.

In terms of marketing, it is a mistake to neglect the potential of marketing research, which may have a negative impact upon Czech universities in the future.

3 Opportunities and Challenges of Using Social Networks

Increasing competition in the higher education in the global crisis produces new challenges to universities. An adequate response to these challenges depends primarily on the competent management of a university, an important task of which is to develop a promising marketing strategy. Currently, in addition to traditional ways of promoting educational services, social networks as a new channel of communication with existing and potential clients are starting to play an increasingly important role.

3.1 Relevant Trends in Higher Education

According to the forecasts of the World Bank positive changes in the world economy are not expected in the next couple of years. Financial instability will continue to have a negative impact on all sectors of the economy. The sphere of higher education is not an exception.

Nowadays higher educational institutions are experiencing similar difficulties everywhere. The situation around educational institutions can be characterized by the following key trends:

- Limited financial support of the state and therefore focus on their own financial resources (primarily due to increase of tuition fees).
- Increase of overseas number of students who are now seen as one of the main sources of university financing.
- Increased competition at the educational market. In several European countries, including the Czech Republic, the situation is being complicated by the fertility decline of the early 90's and the lack of entrants. This situation is the most difficult for commercial universities where teaching is being done only on a commercial basis and where there is a strong struggle for each entrant.

- Increased state control over the quality of educational services. The state makes tougher the requirements towards to university accreditation.
- Opening massive on-line courses by many universities. Courses are considered as a fundamentally new concept of learning. This concept has many advantages both for universities and students. It provides an opportunity to significantly save time and money, and essentially expand university target audience.

Overcoming these negative tendencies, meeting new trends and, as a consequence, keeping a university competitiveness on the educational market depends, first of all, on the competent university management. The latter includes primarily an adequate understanding the issues and the developing an effective marketing strategy by university specialists.

An aggravation of the intercollegiate competition and competition for the students is being inevitably accompanied by growth of advertising activity in this sphere. As the traditional one-way communication channels lose their effectiveness, all universities are actively looking for other ways to promote their services into the market. One of these effective communication channels, that allow efficiently solving a wide range of marketing and advertising tasks, is social networks.

Social networks are a relatively new phenomenon, and their role in our lives has not jet been completely investigated. A huge amount of statistical information available on the Internet requires an accurate analysis. However, many marketing experts consider that companies that produce products or services aimed at the end user must be present in social networks to effectively interact with existing and potential customers.

It is already clear that the "competent" company's presence in social networks has a great number of positive points. Social networks allow quickly and effectively informing the company target audience,

forming its image, getting feedback and having a valuable channel for receiving customer data for future marketing campaigns [3], [33]. The secret of the new technology success is mainly its ability to maintain a constant dialogue with each customer and build long-term relationships with them [48].

This article aims to analyze the current situation, opportunities, prospects and issues of using social networks in the university marketing policy.

3.2 The Role of Social Networks in University Marketing Policy

Social networks today are one of the most popular services that hold attention of more than half of the Internet audience (more than a billion people around the world). For example, in the Czech Republic almost half of the population (48%) has access to the Internet, among them - about 42-44% - users of social networks. Nowadays total audience of social networks, for a long time being used by youth, is growing mainly due to the older age categories. Two-thirds of social networks users (70%) are people from 18 to 44 years. This fact shows that social networks are not just a way of entertainment, but also an effective channel to promote business.

The possibilities of using social networks as a marketing channel for educational services promotion have been actively discussed for the last few years only. However, it can be already stated that building online communities, uniting people by specific interests, is the most rapidly developing area of university internet marketing. Thus, according to the University of Massachusetts study, 98% of higher education institutions in the United States have their official pages on Facebook, 84% - in Twitter, 86% - in YouTube. And, more than 90% of these educational institutions believe that their experience of social network usage is successful.

Internet marketing in social networks provides universities with a broad range of unique opportunities to promote their products to the educational market. Let us describe in details some of them:

- Integration between social networking and university Web sites and two-way communication between them creates an additional traffic on university Web sites. Increasing university Web site's audience creates favorable conditions for an effective promotion and sale of educational services to consumers.
- Consultation of potential entrants and their parents on social networks can be carried out non-stop 24 hours 7 days a week. Thanks to the quick response to customers' questions, the quality of service is being improved. A new form of such interaction promotes higher education institutes and helps them to solve existing problems with an admission of entrants for educational programs. At the same time, traditional forms of university presentation and getting acquainted with them in the form of open days are gradually losing their strength and become ineffective.
- Social networks are widely used for students' support and provide an additional channel of communication between students and university administration. Quality of learning process is been improving due to rapid responses to the student requests.
- Social networks provide a unique opportunity for universities to conduct market research. This is an extremely useful tool to research focus groups, targeted audiences, labor market and market of educational services.
- Social networks are a powerful feedback channel between administration of university and students, university and employers, university and graduates. For example, investigation of the graduates' evaluation of their competitiveness at the labor market can become a platform for quality assessment of university training and subsequent modernization of syllabus.

- Social networks help universities to expand their target audience, primarily due to foreign students.

3.2.1 Social Networks in the Learning Process

However, it should not be missed out that a competitiveness of universities is mainly determined by the quality of educational services. One of the ways how to increase the level of education is an introducing new non-traditional methods of teaching into educational process.

Lately the global pedagogical community has started to actively discuss possibilities and prospects of social networks usage in training process [3], [31]. A cumulative experience in this sphere allows experts to call social networking as a revolutionary method of teaching, as it develops students' creative thinking, and forms skills of self-organization and interaction [1].

This new technology is based on western theory of social learning [21]. According to this theory, people learn better when interacting with each other within a specific theme or subject. On the basis of research, students who study in groups, at least once a week, are better trained in the subject matter than students who are engaged in on their own.

Among the advantages of social networks usage in the educational process the following key points may be marked:

- The well-known communication environment of social networks allows building informal communication between teacher and students and helping to organize person-centered learning.
- The active interaction between teacher and students provides continuity of the learning process that goes beyond classrooms lessons.
- The usage of forums and discussions in working process of virtual training groups stimulates students' active cognitive activity.

- The educational process becomes flexible, variable, varied due to combination of the traditional classrooms and on-line teaching forms, as well as the usage of various media materials.
- Common communication environment for all members of the educational process allows everybody to participate in a common discussion of project results and to evaluate contribution of each member in the common affair.

The low level of teacher´s respective competences, as well as a large number of man-hours needed for teachers to organize and support the learning process in this new way should be noted as problem points of social networks usage.

The new method of training significantly helps to improve the quality of education. In the professional community and among consumers it has a positive effect on the image of university as an expert in the area of innovative learning technologies. All this eventually influences the position of the university in international ranking of educational institutions.

So, it is clear, that a competent and, as a consequence, successful presentation of the university in social networks is not an easy task. It requires a certain amount of knowledge, skills and effective collaboration between teachers, staff, various departments and management of the university. The solution to this management issue involves a number of steps:

- The need to study successful experience of using social networks by other universities around the world.
- Conducting market research to choose suitable social platform/platforms that meets marketing objectives of specific educational institution [49].
- Presentation of all major departments of the university in chosen social networks.
- Train staff to work in social networks.

- Awareness of importance to support a regular contact with clients in social networks.
- Development of social media guidelines for communication with the university target audience by using social networks.

Training of teachers, their material and moral encouragement are essential for staff motivation to use social networks in learning process. University support of all teachers' initiatives concerning development and approbation of new educational methods with usage of social networks are necessary for modernization of teaching methods.

3.2.2. Czech Universities in Social Networks

A powerful impulse of social networks development in the Czech Republic, no doubt, was the fact that they became available in Czech language a few years ago. At present, all world social networks are gaining confidence at the Czech market. Nowadays Facebook is the most popular social network in the country. Facebook audience here is more than 2 million people. Forecast of Facebook development, as well as of other world social networks in the Czech Republic, is very optimistic. Further increase of their number of users is expected in the next years. At the same time, earlier popular domestic social networks such as Lide.cz / Spoluzaci.cz (Seznam.cz) and Libimseti.cz are continuing to lose their positions at the Czech Internet market.

Czech universities are surely not out of this world trend, although they are following it with some delay. According to our research, 68% of all universities in the Czech Republic have the official page on Facebook, 17.8% - in Twitter, 16,4% - in Skype, 8.2% - in Google +, 2.7% - in Linkedln. It is obviously that due to stronger competition private universities are much more actively being become familiar with social

networks. Thus, 74% of private universities in the Czech Republic have their profiles on Facebook and only 57% of the state universities.

The presence of universities in social networks can not be considered as the guarantee of marketing success. In order to be successful regular interacting with the audience and quality monitoring of this interaction is required. Social networks provide a number of opportunities for such monitoring. In this part of the article we will focus on assessing the effectiveness of Czech university pages on Facebook.

Anyone visiting a company (in our case – university) page on Facebook can see two metrics: the total "People Talking About This" on the left side of the page and the "Total Likes" – on the right one (see Fig. 12) [28]. This statistical information is luckily available to everyone and can be efficiently used for the purpose of our investigation.

Fig. 12.: Facebook metrics "Total Likes" and "People Talking About This"- Source: Facebook

"Total Likes" shows the number of unique people who have “liked” university's Facebook page, regardless of whether they are actively engaging with it or not. It is the total number of fans or followers that university's page has managed to accumulate. It is a measure of how many people have come across a specific Facebook page and found it useful or liked it.

Unfortunately there are plenty of Facebook pages with huge follower counts but horrible engagement. Certainly nobody wants that.

Everybody wants good, quality followers who interact. Facebook page must have fan engagement in order to truly succeed. How to measure fan engagement?

In addition to “Total Likes”, there is one more metric - “People Talking About This” [28]. This metric shows the number of unique users who have created a “story” about a specific Facebook page in a seven-day period. Users create stories when they like the page, post on the page wall, like a post, comment on a post, answer a question, write a recommendation etc. This metrric gives information of how many people are actively dealing with a Facebook page in a seven-day period. It is important to underline, that this metric tracks only unique users interacting with a page. It means if a fan leaves more than one comment or both likes and shares a post within that limited time, it adds only one point to "People Talking About This". However, the number changes daily so it is important to engage fans consistently to keep this number up.

Those two metrics are used for calculating the overall level of engagement on university's Facebook page. It is the ratio of the “talking about this” number to the number of “likes”. This indicator shows proportion of users actively engaged on this page. This metric has been called the Facebook Engagement Factor (F.E.F.). It is calculated by the following way: *Facebook Engagement Factor (F.E.F.) = (Number Talking About This / Number of Likes) X 100* (because this ratio of “talking about” to “likes” is usually small, it is multiplied by 100 for more obvious comparisons).

Let’s take the example of Yale University. This university had about 12.392 fans about it over the last 7 days. Divide this by its 541.632 likes on Facebook, multiply it by 100, and we get a Facebook Engagement Factor of 2.23.

3.3 Research results of Using Social Networks

- Which of Czech universities do well on the F.E.F.? The results of our monitoring are presented in the Table 11. It is important to note that "People Talking About This" is being updated daily, so Facebook Engagement Factor varies a lot from day to day [44], [45]. Data for this analysis were collected on May 17, 2013.

Table 11.: The results of our monitoring Facebook Engagement Factor (F.E.F.) of Czech Universities

University	Total Likes	People Talking About This	F.E.F
Private universities			
The College of Bank	1474	12	0,81
European Polytechnic Institute	303	3	0,99
The Institute of Hospitality Management in Prague	1394	19	1,36
The University of Finance and Administration	4611	58	1,26
The College of Karlovy Vary hgh	260	5	1,92
Ostrava Business School	1158	11	0,95
SKODA AUTO University	1473	34	2,31
Josef Skvorecky Literary Academy	387	12	3,1
The Private University College of Economic Studies	307	4	1,3
University College of Business in Prague	3303	34	1,03

Academy STING	621	3	0,48
Metropolitan University Prague	3529	52	1,47
The Jan Amos Komensky University Prague	3654	71	1,94
The College of Karel Englis	598	33	5,52
Anglo-American University	2306	22	0,95
The Prague College of Psychosocial Studies	1023	6	0,59
The University of Economics and Management	2082	31	1,49
University of New York in Prague	32808	2495	7,6
College of Information Management, Business Administration and Law	8226	94	1,14
The University of International and Public Relations in Prague	269	5	1,86
West Moravian College Třebíč	169	15	8,86
The college of physical education and sport PALESTRA	457	11	2,41
NEWTON College	989	128	12,94
The College of Nursing	431	13	3,02
Brno International Business School	440	3	0,68
Private College of Economic Studies in Znojmo	354	5	1,41
Moravian University College Olomouc.	432	20	4,63
CEVRO Institute	2205	131	5,94
Unicorn College	2753	5	0,18
AKCENT College	192	0	0
Archip	2785	64	2,3
College of Applied Psychology	1383	20	1,45

State universities			
Czech University of Life Sciences Prague	8725	122	1,4
Mendel University in Brno	5562	333	5,99
University in Ostrava	5327	67	1,26
University in Opava	2266	93	4,1
Technical University in Liberec	4537	154	3,39
Jan Evangelista Purkyne University in Ústí nad Labem	2609	60	2,3
Palacký University Olomouc	5194	57	1
University of Pardubice	4026	45	1,12
Tomas Bata University in Zlin	3565	68	1,91
The University of Veterinary and Pharmaceutical Sciences Brno	2983	39	1,31
The Institute of Chemical Technology, Prague	3525	98	2,78
Institute of Business and Technology in Ceske Budejovice	2395	22	0,92
Brno University of Technology	1533	101	6,59
University of West Bohemia in Plzen	373	219	58,71
The College of Polytechnics Jihlava	2000	34	1,7
University of Defense Brno	294	13	4,42

Source: Facebook, Ministerstvo školství, mládeže a tělovýchovy [25], calculation - authors

- The main question for evaluating results of our investigation is "what are good interaction rates?" Social media experts have composed a scale of engagement rates on Facebook [39]. These average engagement rates have been calculated on the basis on analytics from more than 500.000 active Facebook pages and surely have significant weight. This scale is applicable to

Facebook pages with relatively small fan count - from 0 up to 10 000 people:

- Above 1% engagement rate is good
- 0,5%-0,99% is average
- below 0,5% is low

For larger fan count – from 20.000 – 50.000 – average engagement rate is much smaller – 0.21%.

❖ It can be concluded on the basis of obtained data that Czech state universities have much higher average engagement rate (3.53) than private universities (1.9). Their level of engagement rate is completely comparable with F.E.F of the best universities in the world. For such comparison look at some examples in the Table 12. Data were collected on May 18, 2013.

Table 12.: For comparison look at some examples F.E.F of Some Best Universities in the World

University	People Talking About This	Total Likes	F.E.F
Harvard University (USA)	59.706	2.611.112	2.3
Princeton University (USA)	5.128	145.540	3.5
University of California, Berkeley (USA)	7.253	171.198	4.23
University of Melbourne (Australia)	1.793	50.552	3.54

Source: Facebook, calculation authors

❖ As it can be seen from Table 11 there is no clear correlation between number of Facebook likes and universities's Facebook

Engagement Factor. A university might have relatively large number of Facebook likes and low engagement factor at the same time (for example, Pražská vysoká škola psychosociálních studií and Unicorn College in Prague). It is the good indicator that it's time to rethink university's engagement tactics on Facebook page for making it more effective.

- How to increase Facebook Engagement Factor? In 2011 it was considered that the average lifetime of a Facebook page post was around 22 hours. New research shows that the average lifetime of post now is only 3 hours. It means that number of posts should be increased. And that is a great challenge for most organizations. Universities should be prepared to deliver several posts every day. Moreover, these posts must correspond to purpose, objectives and university's brand. So, the success of communication with the audience lies in activity of this communication and its content.

Specificity of university's operations and characters of its young target market (age from 18 up to 24) should be taken into account when developing Facebook content. Attractive university's Facebook page must expertly balance different types of content:

- **Educational content** in catching form such as video presentation of university, its departments and teachers, video lectures, on-line consultations etc. For example, Vysoká škola finanční a správní in Prague is regularly putting video news on its Facebook page. Vysoká škola ekonomie a managementu in Prague shows video interviews with all university's quests on its Facebook profile (see Fig. 13).

Fig. 13.: Video interviews with all university's quests on Facebook profile of Vysoká škola ekonomie a managementu in Prague. Source: Facebook

- Fun content, for example funny pictures, video spots, music video – these can be completely unrelated to page's purpose. Look, for example, at some funny posts on Facebook profile of Vysoká škola manažerské informatiky a ekonomiky that in a moment caused a large number of audience's likes (see Fig. 14, 15).

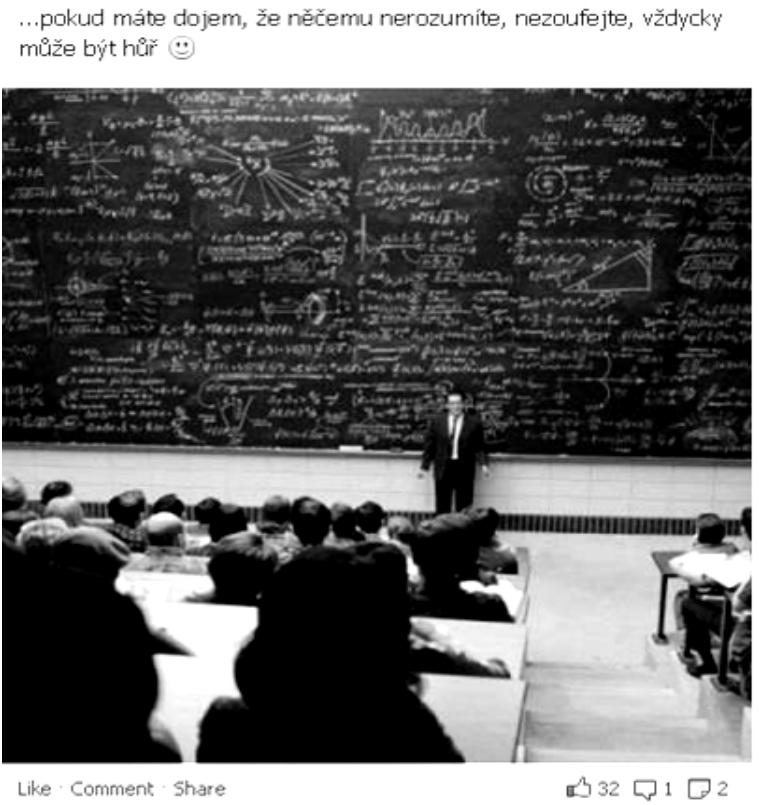

Fig. 14.: Funny post on Facebook profile of Vysoká škola manažerské informatiky a ekonomiky. Source: Facebook

Fig. 15.: Funny post on Facebook profile of Vysoká škola manažerské informatiky a ekonomiky. Source: Facebook

- **Interactive content**, for example content that would require an audience to offer their opinion. It works best if it has relevance to page's content concept. See, for example, surveys of students and graduates conducted on Facebook pages by Vysoká škola manažerské informatiky a ekonomiky (see Fig. 16) and Bankovní institut vysoká škola in Prague.

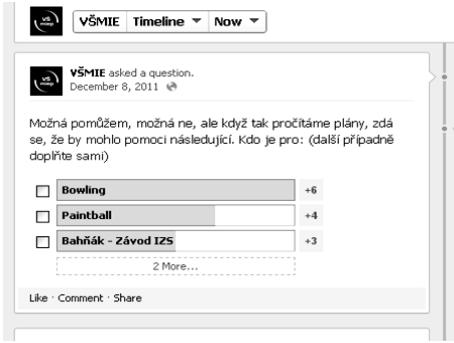

Fig. 16.: Surveys of students on Facebook page of Vysoká škola manažerské informatiky a ekonomiky. Source: Facebook

❖ Incentive content, for example quizzes that offer prizes. See, for example, photo competition at Technická univerzita in Liberec conducted on Facebook profile (see Fig. 17).

Fig. 17.: Photo competition on Facebook profile of Technická univerzita in Liberec. Source: Facebook

❖ **Provocative content**. Provocative content goes viral because it is the content people are looking for and it ignites emotion. People bookmark provocative content and share it with their friends. Provocative content makes people really pay attention to what it is they are reading or watching (see Fig. 18).

Fig. 18.: An example of provocative content on Facebook profile of university. Source: Facebook

4 Electronic Trading – Data, Information, Knowledge

Business processes implemented electronically with the use of information technology and information systems are called electronic business.

Electronic business is the broadest area. E-commerce creates a component part of e-business; internet shop is part of e-commerce, (see Fig. 19).

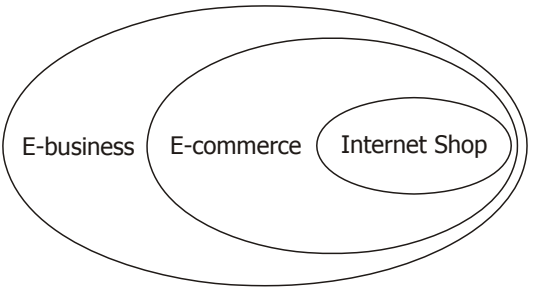

Fig. 19.: Components of e-business

4.1 Possibility of E-Business

In practice, there are many ways how various electronic modes can be used in doing business. It need not be a complete e-commerce. For example, most internet shops use electronic communication and contacts only to support their sales.

Electronic and other modes of business are subject to similar principles. It is not important in what area a particular business takes place, whether for example, the purchase and sale of goods, provision of services or any other field. The only difference lies in the use of special tools, i.e. the use of information technology and information

systems in e-business. What is very important is the method of communication, especially the types of communication channels.

However, neither e-commerce nor e-business in general, can be carried out exclusively in an electronic way.

For customers it is indeed important and advantageous to see through the Internet goods intended for purchase and to get their technical and other parameters. Sometimes, it is possible to find opinions of other customers regarding the quality of a particular product, reports and results of product testing of various professional bodies, etc. The customer can get such information electronically from home or office. Likewise, the customer can order any goods or services electronically and should only determine the timing and method of delivery and payment. The actual delivery of goods is carried out usually in a classic way. Exceptions for the benefit e-commerce apply to rendition of services such as consulting, advisory services, acquisition of e-books, magazines, journals, etc.

On the contrary, the purchase and sale of some goods can take place as described above. A simple and concrete example might be the purchase of a wedding dress. It is difficult to imagine a bride who, through the Internet, chooses a wedding dress, determines the correct size and orders its delivery without seeing it and personally trying it on. In this case, e-commerce could serve only to provide basic information and perhaps arranging the time to try it on.

When planning and setting up e-commerce we must consider the subject of sale, possible needs and requirements of customers and other specific conditions resulting from these factors [37].

Individual customers are the most important component of any business. Electronic commerce should focus on meeting their needs in a broader sense, i.e. it need not concern only the final sale of any goods or rendition of services. What is important and particularly significant in the electronic business and commerce is the systematic organization

of all activities starting with the acquisition of raw materials, data, etc., to the ultimate satisfaction of customers´ needs.

When planning and setting up e-business it is relevant to electronically provide only those activities that simplify, accelerate, or otherwise streamline the operation of the whole business. Electronic business is a means to achieve a certain effect, therefore, it can´t be the goal, regardless of their anticipated benefits.

One of the decisive factors in the management efficiency and competitiveness of the enterprise become information technology and information systems, which also form the foundation of electronic business and commerce. The development of electronic business is directly proportional to the development of information technology and information systems.

Therefore, their mastery and understanding has become a prerequisite for the success of managers in all fields of economic activity. Acquisition of necessary means of information technology and the construction of the enterprise information system is neither easy nor cheap.

Even the most sophisticated information technology and information systems need not be sufficient. Their quality and success of use will always depend on the quality of human factor [32].

When creating a system it is important that it always be based on a thorough analysis and respects all fundamental factors.

The initial step is always to set targets to be achieved in the future. It is also necessary to forge links between all the requirements in order that all the objectives are respected and the whole system is directed toward fulfilling them.

In e-business, there is certainly a need to process data and information. This requires to pre-define not only the means - information and communication technology, but methods of their processing - information systems - must be determined as well. At the same time, it is necessary to realize that the whole system will be managed by

people on both sides, i.e. entering the necessary data (eg on the part of the customer) and their processing (eg the operating system of a specific company). All of these people must be able to work with the system at a level appropriate to their relation to this system (eg customer, system administrator, data administrator, etc.). Therefore it is desirable that in the creation of the system not only mental structures, but also social conditions of people who will come into contact with the system in any way in the future will be considered and reflected [35].

4.2 Data, Information, Knowledge

Using information and communication technologies can be useful in solving various problems, issues, etc., in various operations with data and information and, at the same time, it is possible to use the required knowledge, or to acquire knowledge itself. In normal conversation, the following concepts may seem synonymous, but if you think about their purpose, we discover crucial differences [10].

Data are data, instructions, and other elements in a form to be workable, or portable with the help of information and communication technologies. Data processing at a particular moment seems to have no meaning or connection with the solved tasks.

Information includes the meaning that is attributed to the data according to certain rules. It is the data that have specific meaning and significance. Alternatively, it may be certain knowledge that can be communicated and transferred through information and communication technologies. If we realize that the data contain certain entropy (uncertainty, insecurity, disorder), we define information as data which can be conveyed, transferable, have a specific meaning, significance and reduce entropy.

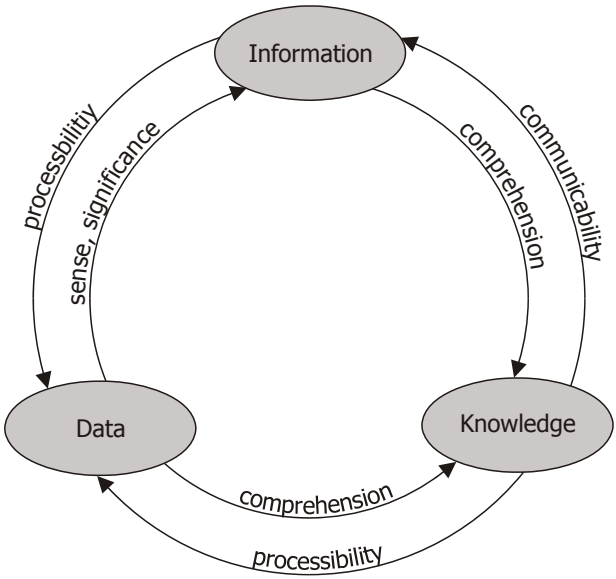

Fig. 20.: Relationship between data, information, knowledge

Knowledge is an outcome of cognitive processes, which are generated and developed on the basis of conscious activity in order to understand the relevant facts. They represent what we know when the data and information are incorporated in the appropriate context [11]. The relationships between data, information and knowledge are illustrated in Fig. 20.

Information systems provide the collection, transfer, storage, transformation, update, and provision of data and information for their use in the management and marketing activities of the company. Information systems use information technology to operate themselves. The primary aim of computer networks is to share their data in a short time and at a great distance. In general, other devices, which are ICT, can be included in computer networks. There can be mobile phones, iPod, iPhone, etc., which are a fundamentally different group. For certain simplicity we will talk only about computers.

There are many different types of networks that can be distinguished according to various aspects. These factors may be determined by the network, this network arrangement, its combination, etc. The types of networks can be combined into larger units with the same or different arrangement, creating homogeneous or heterogeneous networks. While large purely homogeneous networks are rather scarce, the number of heterogeneous networks is large due to many different arrangements. Examples of the most heterogeneous network is the Internet [34].

4.3 Problem Formulation

Internet as a means of transmission provides a huge amount of data, information and knowledge, which can be used [36].

Vastness of the Internet and the huge number of available resources are prerequisites for its use. However, we must realize that when searching for relevant information we can also come across the pages of dubious quality, even illegal sites which may impair the mental and moral development particularly of youth (promotion of racism, violence, etc.).

When obtaining information from the Internet one can be subject to all kinds of communication noise. In electronic communication we usually lack non-verbal communication, which would effectively support the encoding passed message.

Textual communication provides for only mere content of the communication for the sake of its brevity, thus may induce its connotation, which may cause the communication noise. Eg even seemingly simple sentence "It is warm today." can be decoded in two ways, if we do not know the context: as an expression of satisfaction or dissatisfaction with the temperature. Forms of redundancy needed for better understanding and communication is disappearing in the decoding due to the aforementioned brevity. To some extent this can

be compensated by using emoticons, but this leads to the suppression of natural language and may give rise to other problems [47].

A significant problems in the social sphere is related to the digital divide and the resulting uneven current opportunities for all people in the globalized world [35].

The importance of obtaining quality information leads people to try to get all information available. In many cases, information is shifted from the auxiliary level aiding to achieve a certain objective to the objective itself [22].

In terms of psychology, overloading people with information plays a significant role in human life in terms of its quality, when a permanent influx of information through communication, especially electronic and mass media, overburdens the mental capacity of an individual.

Misunderstanding acquired information leads to stress and anxiety at many people. One then spends too much time looking for clarification or additional information and explanation [24].

Unfortunately, an inverse relationship applies in electronic communication. The more time a person spends in electronic communication and other activities on the computer, the less time he or she spends with family and friends. This reduces the number of persons belonging to his social circle. This in turn can lead to feelings of loneliness and to depression [17].

The rating of the quality of service was based on the research of e-business companies that operate in the field of audiovisual resources. We have concentrated on electronic marketing oriented at professional customers. These customers are not only interested in the mere existence of any audiovisual means in the menu. They do not care about the existence of the product without a detailed description of its characteristics. They are interested in how and under what conditions they can use a particular product or service, what the optimal use would be, what expenses they should expect in connection with all technical means of learning to think. Of course, those customers are

interested in detailed technical parameters of equipment. We should assume that the supplier of technical teaching aids presents all information to the specialist customer, who is able to understand it. Information plays an important role as instruments and equipment with identical or nearly identical parameters can be produced by several manufacturers. The focus of a customer on a particular brand can often be misleading. If the client does not understand the data submitted, the supplier should provide expert advice and assistance. The information presented on the website can therefore be seen as a basic expression of willingness of the supplier to provide all the knowledge and information to the customer [4].

If e-commerce on its website offers to supply certain, in our view a key element of the product range in the field, we will consider it as an existing service. But if this offer is not accompanied with a detailed range of specialized data specifying the suitability of the instrument or device, the effectiveness of the service would be identified as zero for the needs of professionals. For e-commerce, it can be assumed that on the basis of an offer submitted electronically the customer would order certain goods directly. The required information must be available in advance. Thus we will proceed to the evaluation of the quality of service using the scale with two values (dichotomous scale) for each monitored component of the service provided.

In this way, we will evaluate what the professional level of the marketing offers of the supplier is. The purpose of such offer is not to provide the customer with dozens of names, prices and photos. An important role here is played by the parameters, suitability, information value of offers and the serious approach to the customer [26].

A simple example might be a microphone. Their names, prices and photos do not impress everyone. An expert is likely to ask about the above-indicated parameters; however, a layman is usually directed by the brand or price of the product and need not even suspect that the specified device (in our case, the microphone) would not be suitable for the intended purpose. It is important that in this case that the

contractor offers to assess the type of microphone, its polar pattern, frequency range (frequency response), sensitivity, or a description of the purpose of use, etc.

This way, we will rate separate items included in two areas that we call (a) work with sound, and (b) work with images.

Statistical calculations concluding the evaluation of every item will result in the assessment of the standard error of estimates, which was achieved during the evaluation. In addition, we set the interval of expected modal values with 95% reliability.

Hypotheses upon which we began our research, are based on our current knowledge and assessment, in which we have participated in some way. This is why we will be more accurate and therefore closer to reality if our hypotheses are formulated negatively.

Hypothesis A1 - Companies supplying audiovisual means do not provide quality service.

Hypothesis A2 - The customer has to rely on incomplete information of internet shops.

Hypothesis A3 – the level of services of online stores in the Czech Republic is low in the area of sound and video projections.

We assume that the presentation of parameters for the purchase of audiovisual equipment via famous website e-commerce suppliers does not contain vital information for the specification of important parameters.

A simple example here can be the parameters of microphones sold, where we assume the following:

Type of microphone (condenser, dynamic, electret, etc.). Many other technical assumptions depend on this.

Directional characteristics – is the microphone able to suppress noises from the environment, and from what directions? It is omni-directional, or does it have cardiod, hyper-cardiod, or narrowly directional characteristics?

Frequency characteristics – is the microphone designed for speech, singing, a solo instrument, an orchestra, noisy stadiums, etc.?

Other details such as sensitivity, impedance, maximum sound pressure or sensitivity to contact noise (hand touch, vibration of the platform) can also not be ignored.

4.4 Research Support for E-Business

In the research, we have included a total of 21 online shops selling audiovisual products. Of these are 13 companies, which can be classified among the top suppliers of audiovisual media in the Czech Republic. The remaining 8 companies were specialist dealers [5].

4.4.1 Overhead Projector

Overhead Projector is an analogue device for projecting handwriting, text, drawing or painting or printed or photographic transparencies. Each overhead projector can be characterized mainly by two data. The first defines the type of OHP with respect to its manipulation. At the same time its robustness is associated with the second data as a more robust OHP can have a higher luminous flux.

Portable overhead projectors in a case are characterized by a lower luminous flux (lumen less than 2500), which is ranked in the lowest category compared with stationary rear projectors.

Stationary overhead projectors are used when we do not expect to have to transport it from room to room or building to building. It is permanently located in one room, or can be transferred it from room to room on a customized cart. An important factor is its significantly higher luminous flux (up to 10.000 ANSI lumens) compared to the easily portable projector in the case. The higher luminous flux of a stationary projector is possible thanks to its robust construction and being equipped with a powerful cooling system that allows for the use of a lamp (or usually lamps) with significantly higher performance.

The disadvantages are the resulting larger dimensions and the weight of the stationary projector.

Another property is determined by the light and technical conditions for its operation. Light and technical conditions are rather a complicated matter that depends on several important parameters. One of them is the contrast (ratio between black and white in the luminance of the screen), which in an overhead projector is determined by the contrast (quality) of the transparency, the luminous flux, the luminance of the projector and the stray light from the projection screen.

4.4.2 Data Projector

Data projectors are currently one of the most important elements of the equipment of presentation rooms. There are many different data projectors, which always have specific characteristics and are designed for specific purposes. The biggest differences now lie in resolution data projectors and their light output.

Types of a data projector is based on the type and number of image chips. The most significant chips are former CRT, later LCD, and newer DLP and LED [16].

DLP Projectors offer, according to various sources, a better picture due to the fact that they have higher contrast, and the pixels are far less visible compared to LCD data projectors. A disadvantage is their lower light output, less sharpness and a possible rainbow effect, where during quick movement the edges of the moving object emit different colors from the rotating color wheel in the optical drive. (The rainbow effect is eliminated in 3-chip DLP data projectors because all colors are processed at the same time.)

LED projectors are essentially DLP projectors, in which the lamp is replaced with LEDs. The advantage is low power consumption in the absence of lamps. The fundamental drawback is then very low luminous flux given in units of tens ANSI lumen. Real LED projectors, which will project an image directly from an illuminated imaging chip,

are based on O-LED or LED, are currently only the aim of research laboratories.

Realistically achievable contrast in projection is a common effect of several factors of light and technical conditions.

First, the level of luminance for the white (brightest) part of the area (unit lux - lx) is approximately equal to the luminous flux in units of lumens (stated by the manufacturer) divided by the size of the projection area in square meters. To this it is necessary to factor in the luminance level from ambient sources (so-called stray light). The result is the overall level of illumination of the screen for white.

For the black (darkest) portion of the surface, we calculate the luminance level according to the manufacturer (under ideal conditions - totally dark), so that the original level of luminance for white only (no stray light) is divided by contrast indicated by the manufacturer. To this level of luminance, one also factors in the level of ambient lighting.

The real level of contrast on the projection screen is obtained by dividing the level of luminance for white (including the level of stray light) the level of luminance for black (including the level of stray light). At the same time we find that a realistically achievable contrast will be significantly different from the value provided by the manufacturer. In many cases details on the projection screen may be indistinguishable.

The situation can be resolved by:

Increasing the luminence or contrast of the data projector, or even buying another.

Reducing the projection area - though this will decrease the range of good visibility by reducing the maximum distance. This would be undoubtedly greater than reducing the minimum distance. (The minimum distance is equal to twice the diagonal of the screen and the maximum distance for the audience is equal to six times the diagonal of the screen.)

Reduction of ambient light - this can not go below a certain limit, in particular if we assume that students will take notes.

The native (physical) resolution of a projector should match the resolution of the computer graphics card, including aspect ratio.

The keystone function is designed for digital correction when the axis of the data projector is not perpendicular to the center of the screen. Use of this function with larger trapezoidal distortions can, however, lead to a loss of quality, or to a so-called moiré pattern (distracting colored shapes).

We believe that it is appropriate for customers to be made aware by the supplier of similar patterns. If, for example, a customer has purchased a top-of-the-line projector Christie Roadster S+12 K with a luminous flux of 10 000 ANSI lumens and contrast of 1 500 : 1, at a price of price 79 995 USD, and it is used in a room with a 3 × 4 m screen, and relatively high stray light of 150 lux (high for the negative influence of the projection, but also relatively low for writing notes), the real contrast would only be 6.5 : 1, which is at the very lower end for resolution and has a very coarse gradation scale. This contrast is quite different than specified by the manufacturer.

4.4.3 Interactive Whiteboards

Although we have a relatively critical opinion of the use of interactive whiteboards, we recognize them as a fully technical tool. We would only slightly temper the initial enthusiasm of those interested in them by drawing their attention to some important aspects of their use.

Basically, there are three basic types of interactive whiteboards.

For front projection use with a data projector – as a rule, data projectors are usually used with extremely short projection distances. A disadvantage is the sensitivity to stray light (see above), uneven brightness of the screen and the need to at least partially darken the classroom.

For rear projection use – they have the advantage that when writing on the board, for example, there is no shadow created as with front projection.

Use of large monitors - mostly touch plasma displays, the trend is also toward large-scale application of O-LED touch display units. An advantage is high brightness, high actual contrast and great resistance to stray light. The prices of these boards unfortunately correspond with the increase in monitor size. For example, a 150-inch board (about 3.8 m) cost, in the spring of 2011, more than 7 million CZK (see details from Mitsubishi at the 2010 CEATEC convention). For these applications, classic LCD or TFT units are not the best option due to significant degradation of image quality when viewed from a larger off-axis angle of the display unit.

Viewing distance plays a very important role. Considering the room, the location and distribution of seats should reflect as much as possible the circle and angle of proper and good visibility.

When using an interactive whiteboard with dimensions of 176 x 141 cm, the maximum viewing distance should not exceed a distance of about 5 m. It is also necessary to consider requirements for a vertical scrolling board. The average person is not taller than 2 m; therefore in a horizontally-arranged classroom, the minimum height of the lower edge of the board should be 150 cm. For some interactive whiteboards (probably for most) there is no optimal arrangement because they cannot move vertically.

4.4.4 Blackboard and Flipchart

For boards and flip charts, the distance from the audience (students) is particularly important. It should be at least twice the diagonal of the whiteboard or flipchart, a maximum of six times of the diagonal. To provide good visibility it is desirable and suitable to provide this information to potential users who may be unaware.

This would likely avoid totally inappropriate use, such as using an A1 flipchart format in a large auditorium.

4.4.5 TV and Monitor

Basically we distinguish five types of monitors - CRT, LCD, LED, O-LED, and plasma monitors. Their characteristics:

CRT monitor - used a classic color screen. This type today has become almost obsolete. CRT monitors had excellent color reproduction, fast response, and were they only type that allowed for a wide range of resolution without negative effects on digital conversions.

LCD monitor - the pixel backlit liquid crystal is formed by using cathode ray tubes. These monitors are used today mainly for smaller screen dimensions which plasma monitors, for example, are unable to achieve.

LED monitor - (incorrect and confusing because there are no active points of light). These monitors differ from LCD monitors in that LEDs are used in the illumination of pixels. This leads to lower consumption and higher contrast thanks to a more faithful display of dark colors.

O-LED Monitor - active points of light (still in the development stage). The principle behind organic LED displays are currently being used in mobile phones and small tablets.

Plasma Monitor - active points of light and excellent color rendering. They are currently produced with a starting screen size of 37" (approx. 94 cm). A significant disadvantage is the relatively high power consumption over previous types.

For the viewing distance it is necessary to preserve that where the monitor has a side ratio of 4 : 3, the minimum viewing distance should be three times, and the maximum viewing distance five times of the diagonal of the screen. The side ratio of 16 : 9 requires the minimum distance to be 3.6 times and 6.1 times the maximum distance of the diagonal of the monitor.

4.4.6 Speakers, Speaker Systems

Speakers and speaker system affect the sound quality in the classroom or hall.

A speaker type determines its principle of work.

Generally, there are the following types of speakers:

Electrodynamic - the most common type used, where the the force produced by the magnetic field placed in the coil induces movement of pistons in the membrane of the speaker.

Electrostatic - operates on the principle of mutual attraction and repulsion of electrically charged plates. A surface membrane with a conductive surface is located between the two fixed electrodes. They are expensive to produce, and problems with reproducing bass tones and a characteristically low sensitivity has pushed these speakers out of the category of high-end devices.

Piezoelectric - (a typical example was Motorola KSN 1001 tweeters) using piezoelectric phenomenon. A disadvantage is the relatively wavy frequency response and possibly larger distortion (especially for lower-quality types). These are currently only marginally used as lower-priced high-tone units in semi-professional speaker systems.

Holosonic ultrasonic speakers make up a special group utilizing a nonlinearity environment for audio. According to the manufacturer and test results, they are primarily designed for local sound in galleries, museums, and for advertising purposes, etc.

The directional characteristic determines the sound pressure dependence on the direction of radiation. It is the measurement for the horizontal and vertical level of listening. In the literature it is also called radiation diagram. In lay terms and very simply put, this diagram illustrates the best possible listening area.

The frequency range is determined by the frequency characteristic that defines the sound pressure dependence of the frequency. It can be presented numerically in a simplified form as the interval defined by the upper and lower frequency, the difference is called bandwidth [6].

4.4.7 Microphones

A high-quality microphone ensures the high quality of the transmitted audio signal at the source of sound. Just as in the case of photos, this quality cannot be later significantly improved.

There are several types of microphones:

Condenser - changes in air pressure caused by air vibrate the membrane that forms one electrode of the capacitor. It is connected to an electrical circuit. Changes in the position of the membrane cause changes in the capacity of the condenser, which causes voltage change between the plates. It requires perfectly stabile power supply. They represent the best type of sensor.

Electret - based on the capacitor type, where the electric field is created by a non-conductive material, electret. They can they (depending on the type and design) achieve very good sound quality even at the minimum dimensions.

Dynamic - when the membrane moves a coil in the magnetic field it creates a so-called modulation voltage. They do not require power, and are less sensitive, but on the other hand usually have very robust construction and are also resistant to rough handling. Top types of dynamic microphones (eg. Sennheiser MD 441) are commonly used in professional practice, and compare unfavorably with condenser microphones.

The microphone type determines its principle of work. The directional characteristics of microphones determine their potential use with regard to the scan direction of sound.

Omni-directional - detects sound virtually the same from all directions.

Cardiod - inhibits the reception of sound from behind, e.g. feedback from speakers. They are particularly useful for stage performances and are a universal choice for conventional sound reinforcement.

Hypercardiod - detects sound from the rear part, however, their directivity pattern is oriented in the direction of the main axis. Detection of sound from the side and the rear, and against the main direction is significantly suppressed.

Octal – this type of microphone, theoretically, does not detect sound from the sides, but picks up sound generally the same from the back and front of the microphone.

Wavelength - specially designed microphones with a length of tens of centimeters (up to 1 m) mainly detect sound from a small angle around the main axis. They are used for picking up sound at greater distances and in acoustically problematic areas

The frequency range is similar to a given speaker frequency characteristics that defines the output voltage and frequency of the sound at a constant sound pressure level. It can be presented numerically in a simplified form as the interval defined by the upper and lower frequency, the difference is called bandwidth. With microphones it is important to know the frequency response over the graph, because it can be used in professional work. For example, the so-called proximity effect, which works with gradient microphones (cardiod, hypercardiod, octal), amplifies the bass when approaching the sound source. Using special acoustic adjustments, for example, one can filter out the noise coming from an area, and capture primarily the source close to the microphone (microphones for transmission from a noisy environment).

4.5 The Results of Practical Research

The research results presented by the technical parameters of equipment suppliers on the web e-commerce sites are in Table 13 and 14.

Shaded values in the table indicate that the observed data can be regarded as sufficiently reliable. The observed data correspond to the 95% reliance interval. The value obtained (greater than 50%) indicates that the majority of Czech suppliers of technical teaching equipment and complete solutions classrooms and halls states, or does not, the important parameters for the selection and purchase of technical teaching aids or their components.

If the value is not in the table tinged and is printed in bold, it means that the majority of Czech suppliers of technical teaching equipment and complete solutions classrooms and halls states, or does not, the important parameters for the selection and purchase of technical teaching aids, or their parts, but the figure is not detected as sufficiently reliable.

Table 13.: Results - Visual resources

Parameter	Stated [%]	Not stated [%]	The standard error of estimate [%]	95% confidence Interval [%]
Overhead Projector				
- type	4,8	95,2	4,6	86,1-100
- lighting technical conditions	0,0	100	0,0	100
Data projector				
- type	57,1	42,9	10,8	36,0-78,3
- lighting technical conditions	4,8	95,2	4,6	86,1-100
Interactive Whiteboards				
- type	4,8	95,2	4,6	86,1-100
- viewing distance	0,0	100	0,0	100
Board and Flipchart				
- viewing distance	0,0	100	0,0	100
TV – monitor				
- type	100	0,0	0,0	100
- viewing distance	0,0	100	0,0	100

Source: authors.

Selected data from our research, which we stated in table 13 and 14, show that most contractors do not act fairly towards all customers. Some customers probably do not even have the necessary knowledge and experience. An exception may be only experts who know about the required parameters and find them before buying them, such as the manufacturer's website. There are not reported in some crucial parameters sold devices, e-commerce websites do not even notice the different functions of principles. Buyers can later be unpleasantly surprised by very different properties of high-quality devices.

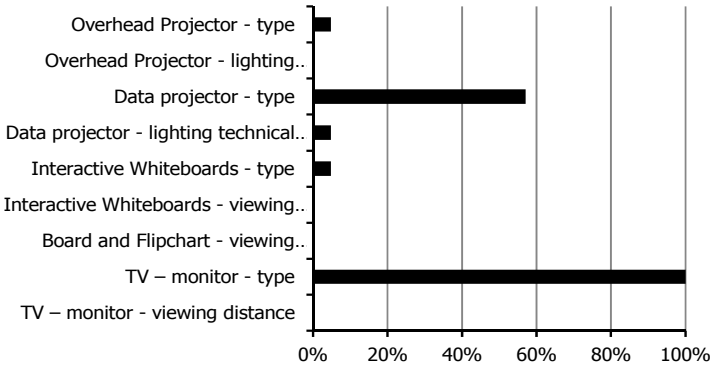

Fig. 21.: Graphical presentation of survey results – visual resources

Table 14.: Results - Audio resources

Speakers				
Parameter	**Stated [%]**	**Not stated [%]**	**The standard error of estimate [%]**	**95% confidence Interval [%]**
Speakers				
- type	16,7	83,3	6,2	71,1-95,4
- directional characteristics	0,0	100	0,0	100
- frequency range	100	0,0	0,0	100
Microphones				
- type	8,8	91,2	4,9	81,6-100
- directional characteristics	0,0	100	0,0	100
- frequency range	8,8	91,2	4,9	81,6-100

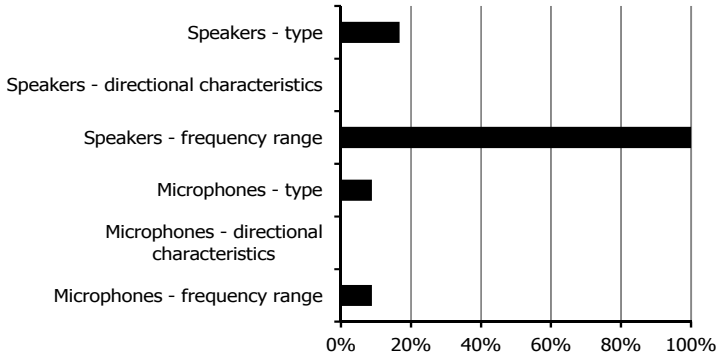

Fig. 22.: Graphical presentation of survey results – audio resources. Source: authors.

4.6 Research Results of E-Business

Hypothesis A1 – confirmed

Online shops supplying audiovisual means do not provide quality service. The hypothesis was confirmed and can be statistically demonstrated that they do not place very important information for the selection of a particular audiovisual device, see Table 13.

Hypothesis A2 – confirmed

The customer has to rely on incomplete information of online shops of supply companies. The hypothesis was confirmed in the same manner as A1 hypothesis. The customer would have to look for the necessary information in other places than at the supplier´s.

Hypothesis A3 – confirmed

The service level of online stores supplying audiovisual resources in the Czech Republic is low in sound and video projections. This hypothesis is again associated with the verification of hypothesis No. 1 It can be assumed that if the online store (vendor) information relevant to the operation of the technical means of learning is not provided in

the sale, it is probably not important. Another possibility would be that the supplier intentionally damages the interests of the customer if he fails to provide the information.

The authors continue to collaborate with various universities to address various research tasks and projects. As part of this, a working group focuses on different areas of auditoriology. The group also deals with various offers as well as the results of projects that have already been realized. From their experience they may also, though in this case only for guidance, verify the correctness of the hypotheses posed. Similarly the authors act as reviewers for projects that have been carried out within the framework of the Higher Education Development Fund.

Conclusion

This monograph brings four interesting views on information management and marketing of the websites. Websites are considered as a tool for the presentation of any subject. They can also be a presentation layer to communicate with the target group or target market segments of e-commerce.

The advantage of this book is its focusing on higher education. This sphere in terms of communication can be considered as a sender of communication message towards its audience and as a recipient as well. All universities have relatively easily determined target audience for their messages. On the other hand, all universities make up the target market audience for suppliers of technical devices used in teaching processes.

The authors tried to use these relationships to point out some elements of information management and marketing in a relatively homogeneous environment of universities. In separate chapters they have supported their opinions with their own researches. The authors show here some shortages found.

This book points out to readers some elements that are important for the proper operation of information management and marketing from the perspective of the target groups or target market segments. In this respect, this book can be considered as beneficial.

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List of Abbreviations

BI – Business Intelligence

blog – a contraction of the words web log

DLP – Digital Light Processing

e-book – an electronic book

e-zine – an online magazine

FAQ - Frequently Asked Questions

F. E. F. – Facebook Engagement Factor

HTML – HyperText Markup Language

chat – display-based conversation between two or occasionally more users

LCD – Liquid-crystal display

LED – Light-Emitting Diode

O-LED – Organic – Light-Emitting Diode

Second Life – an online wirtual world

SWOT – Strenghts, Weaknesses, Opportunities, Threats

TFT – Thin Film Transistor

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About authors

Jan Chromý was born in Prague, Czech Republic. He completed his Master´s studies at the Faculty of Mechanical Engineering of the Czech Technical University, specialization manufacturing technology, in 1981. He completed the Doctoral Studies Programme at the Faculty of Education of the University in Hradec Králové in 2006, focusing on the theory of teaching technical subjects.
He worked as a senior research and development specialist in the ČKD-Lokomotivka enterprise, and later as a senior technician in the production management in the same enterprise. Since 1993 he has been working as a teacher. The initial period 1993-2000 was at a secondary school specialised in hotel management; since 2000 he has been a university teacher at the Institute of Hospitality Management in Prague. He is the Head of the Department of Marketing and Media Communication of the Institute, and an assistant professor in the Department of Technical Subjects of the Faculty of Education of the University in Hradec Králové. His major publications include monographs "The Role of Technical Teaching Tools within the Electronic Marketing of Universities" (published in Czech; Prague, Czech Republic: Verbum, 2012), "Material Didactic Tools in the Information Society" (published in Czech; Prague, Czech Republic: Verbum, 2011), "Utilization of Communication and Media within Hotel Management and Tourism" (published in Czech; Prague, Czech Republic: Verbum, 2010), "Marketing and Media in Hotel Management and Tourism" (published in Czech; Prague, Czech Republic: Verbum, 2010), "E-business" (published in Czech; Prague, Czech Republic: VŠH, 2009); in addition, he published 25 articles in proceedings from international scientific conferences and more than 60 articles in reviewed scientific journals. His main specialist subject area has been the use of information technology, communication strategies and didactics in marketing.
He is a member of the Academic Council of the Institute of Hospitality and Management in Prague, the publisher and editor-in-chief of the specialist peer-reviewed journal called Media4u Magazine – the journal entered in the list of reviewed non-impact journals published in the Czech Republic kept by the Council for Research, Development and Innovations of the Czech Republic. He is a member of the editorial board of the Journal of Technology and Information; he has acted as an official reviewer of projects submitted to the Fund for the Development of Universities in the Czech Republic.
He is head of team of project SV PdF UHK No. 2130/2013 - Evaluation of information and marketing Web site quality as feedback for educational purposes.

Liubov Ryashko was born in Ekaterinburg, Russia. She graduated from the Ural Federal University (Russia, Ekaterinburg), the Department of History. In 2000 she defended her dissertation focusing to the issues of the intellectual history in the Byzantine Empire of 13th century. The results of conducted research were presented in 2001 at the 20th Byzantine International Congress in Paris.
From 2000 to 2009 she was working as a lecturer of the Ural Federal University (Ekaterinburg, Russia), the Department of «Socio-Cultural Service and Tourism». From 2007 to 2009 the author was taking part in regular seminars organized by the University for improving the level of hotel staff qualification. At the same period she was a consultant of IT-company «Reksoft» (Russia, St. Petersburg, www.reksoft.ru), well-known producer of software systems for hotels. In this role she composed training materials for the company's product «Edelweiss / Medallion» which is software for hotel business automation.

Currently she is working as a lecturer at the Institute of Hospitality Management in Prague, the Department of Marketing and Medial Communications. The author is providing following courses - Hotel Event Management, Hotel Marketing, and Information Technology.
She is editorial board member of journal - Media4u Magazine. The magazine is designed to support an educational process focusing on the following issues: Educational Technology, Didactics, Communication Informatics, Use of Media and Mass Media etc.
The author is a member of scientific international project running at the Institute of Hospitality Management in Prague. On the basis of collaboration with the Ural Federal University (Russia, Ekaterinburg) a comparative analysis of trends in modern hotel industry by analysing hotel web sites is being conducted.
She is external member of team in project SV PdF UHK No. 2130/2013 - Evaluation of Information and Marketing Web Site Quality as Feedback for Educational Purposes.
She is the author of several publications in the sphere of marketing and information technologies.

Donna Dvorak is from Chicago, U.S.A. She finished her bachelor's degree in cultural anthropology at the University of Illinois, in Urbana, Illinois in 1994 and earned her master's degree in TESOL and applied linguistics in 2004 from Indiana University in Bloomington, Indiana, U.S.
She worked as an English language instructor at the College of Travel and Tourism in Karlovy Vary, Czech Republic from 1995-2000 and again from 2004-2007. In between she returned to the United States and worked at the Center for English Language Training in the Intensive English Program for Indiana University. She is currently working as a senior lecturer at the Institute of Hospitality Management in Prague teaching English language and leading the IHM team in the international WelDest project. Editorial Board Member of Journal - Media4u Magazine. The magazine is designed to support an educational process. Magazine has a focus on the following issues: Educational Technology, Didactics, Communication Informatics, Use of Media and Mass Media etc. She has published various articles on language teaching and communication and tourism-related topics including: Business Intelligence approach as communication tool of tutors and teachers in technical education. Malta: WSEAS Press, 2012.; Development of Skills and Competencies for Students of the English Language Bachelor's Program at IHM. Praha: Výsoka škola hotelová, 2011; Friendly versus Familiar: the importance of register in English language teaching when preparing students for careers in the hospitality industry. In: Fórum cudzích jazykov. Sládkovičove: Vysoká škola Visegrádu, 2011.
She is a member of the international TESOL association and is currently studying for a master's degree in destination management at the Institute of Hospitality Management in Prague.
She is external member in team of project SV PdF UHK No. 2130/2013 - Evaluation of information and marketing Web site quality as feedback for educational purposes.

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Jan Chromý
Liubov Ryashko
Donna Dvorak

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